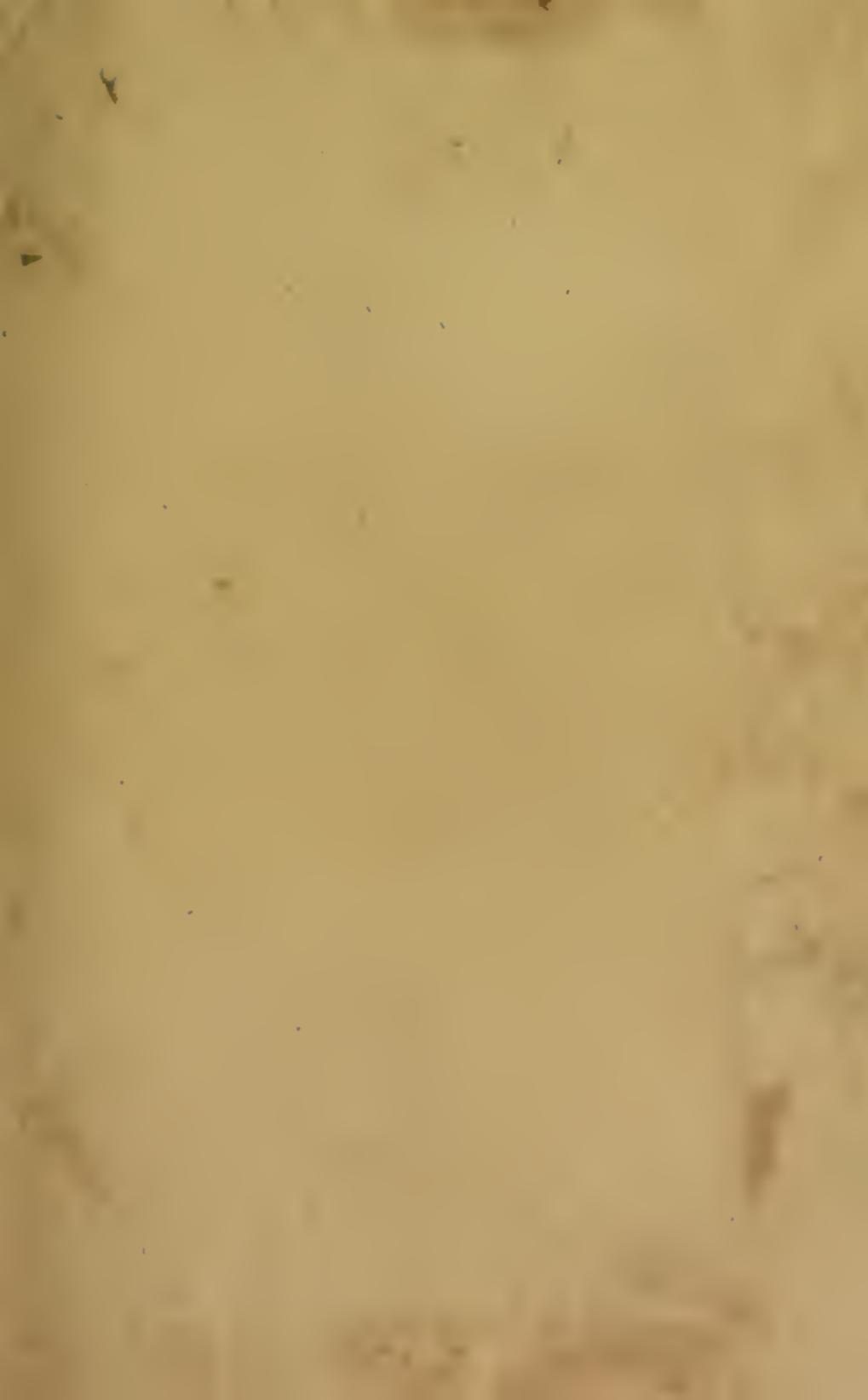
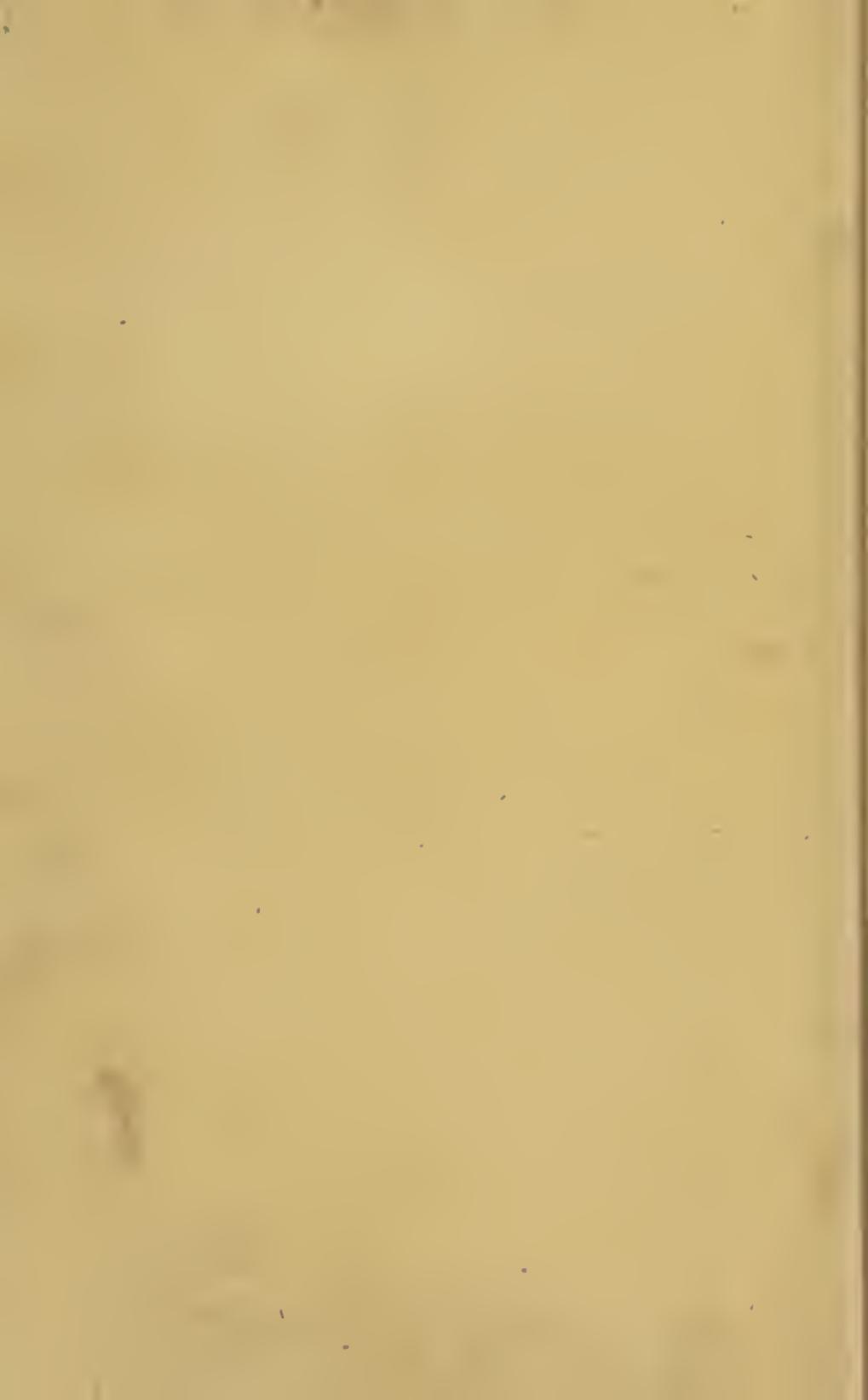




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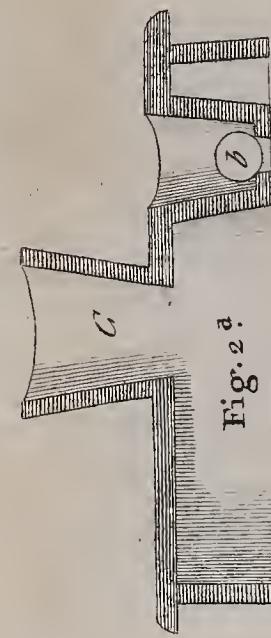
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on some other Diseases of the Lungs.

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So far as it is concerned in Preserving and  
Reinstating the Health of an ANIMAL.

Accompanied with  
Some STRICTURES on the Treatment of  
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SURGEON at PLYMOUTH.

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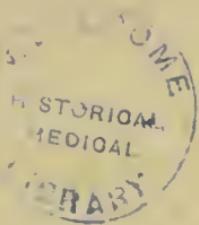
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M.DCC.LXXX.



## Explanation of the PLATE.

### FIG. I.

THE Inhaler, as it appears when fitted for use; except that the Grating (*a*), which then ought to cover the hole, is now turned back, to shew the opening into the Valve.

### FIG. II.

A SECTION of the Cover; in which is shewn the construction of the Cork Valve (*b*); and also the conical part (*c*), into which the flexible Tube (*d*) is fixed.

WHEN the Inhaler, which holds about a pint, after being three parts filled with hot water, is fixed at the arm-pit under the bed-cloaths, the end of the Tube (*e*) is to be applied to the mouth; the air, in the act of inspiration,

inspiration, then rushes into the Apertures (*f*), and passing through the hollow handle, and afterwards into a hole in the lower part where it is soldered to the body, and therefore cannot be represented, it rises through the hot water, and is received into the lungs, impregnated with vapour. In expiration, the contents of the lungs are discharged upon the surface of the water; and instead of forcing the water back through the hollow handle, the air escapes by lifting the round light Cork Valve (*b*), so as to settle upon the surface of the body, under the bed-cloaths.

THUS the whole act of respiration is performed, without ever removing the instrument from the mouth.

THE flexible part of the Tube (*d*) is about six inches long, fitted with a wooden mouth-piece (*e*) at one end, and a part (*g*) of the same materials at the other, to be received into the Cone (*c*) on the cover. This flexible tube is made by winding a long slip of silk oil-skin

oil-skin over a spiral brass wire. This should be then covered with one of the same size, of thin silk, and both be secured by strong sewing silk wound spirally round them. Some length and degree of flexibility is necessary to this tube, for the sake of a convenient accommodation to the mouth when the head is laid on the pillow.

CARE should be taken by the workman, that the cover should be made so as to fit very exactly; or, if it does not do so, the defect should be remedied by winding a piece of cotton wick, or some such contrivance, round the rim underneath the cover, so as to make it air-tight. The Cork, likewise, which forms the Valve, should be made, for the above reason, as round as possible. It is also necessary to remark, that the area of the holes, on the upper part of the handle, taken together; the size of the hole in the lower part of the handle, which opens into the Inhaler; the opening of the conical Valve itself; and that in the mouth-piece, as well as the cavity or inside of the flexible Tube, should be all equally large, and

of such dimensions, as to equal the size of both nostrils taken together: in short, they should be, severally, so large, as not only not to obstruct each other, but that respiration may be performed through them with no more labour than is exerted in ordinary breathing.

N. B. It is necessary to observe, that care should be taken, when the Inhaler is in use, that the ingress and egress of the air through the holes on the top of the handle, and those in the grating on the cover, should not be interrupted by the bed-cloaths.

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☞ The Inhalers are to be purchased of *W. Barnes*, Pewterer, No. 157, Fleet-street, by particular Appointment of the AUTHOR.

TO  
Sir JOHN PRINGLE, Bart.  
PHYSICIAN to the QUEEN,  
A N D  
PRESIDENT of the ROYAL SOCIETY,  
&c. &c. &c.

SIR,

I HAVE long, and very earnestly, wished to express the sense I entertain of the many distinguished instances of friendship and esteem which

A you

## DEDICATION.

you have been pleased to confer upon me. The additional honour, therefore, which the permission of prefixing your name to the following tracts has done me, gives me the greatest satisfaction: not, Sir, that I have the vanity to think their merits have much pretension to your notice; nor, on the other hand, any apprehension that your obliging patronage can expose you to dishonour from their defects; but,

## DEDICATION.

but, as profound abilities in science, founded on the basis of PROBITY and VIRTUE, must ever render a character splendid and respectable, I shall always esteem it an honour to have been able, thus publicly, to subscribe myself

SIR JOHN PRINGLE's

Much obliged

And affectionate

Humble Servant,

JOHN MUDGE.



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T H E  
P R E F A C E.

EVERY medical discovery has certainly a claim to the public attention: for though, on a superficial view, the disease should seem slight, or the treatment trifling, yet, when we reflect that the welfare of the great body of mankind is concerned, deriving consequences from that consideration, it swells into importance.

INDEED, as the aggregate or great mass of physical, as well as every other species of knowledge possessed by mankind, must be the result of the communicated experience of individuals, so it becomes the duty of each to impart, in this experimental traffic, such treasure as he shall have gathered towards the increase of the public stock ; and there is great reason to suppose, if this had been simply and faithfully observed, that though the greater part had contributed their mite only, yet, supposing even that to have been sterling, the capital would have been much larger than the world is at present possessed of.

IT was, no doubt, from this idea, that Dr. Sydenham was not ashamed

to

to say, if his whole life had been employed, provided he had at last succeeded, in the discovery of an effectual remedy even for the cure of corns, he should have thought his time had been employed to a good purpose, and that he had deserved well from the Public. On this consideration, therefore, I might rest my apology for the present intrusion, was the discovery of the cure for the Catarrhous Cough, or that distressing affection of the trachea and lungs, upon taking cold, of much less importance to health and life than in fact it is. But, on the contrary, those complaints of the breast frequently become diseases truly formidable to tender constitutions, inasmuch as, from their delicacy, they are not

only extremely obnoxious to the ill impressions of cold, but the lungs themselves, in this constitutional feebleness, at the same time that they can less bear the convulsive agitations of an importunate cough, are also, from their tender substance and delicate order of vessels, more subject to be injured by pituitous matter made acrid by a long lodgement in the extreme branches of the bronchiæ. Very fair people, with delicate complexions and vermillion cheeks, especially if under the influence of hereditary impressions; and thin lean habits, with hollow temples and high cheek bones, where the *cartilago scutiformis*, the last vertebra of the neck, and the processes of the *os sacrum*, are found remarkably prominent, are more particularly

cularly exposed to hectic complaints;\* and in both these Catarrhous Coughs are really dangerous, and often lay the foundation of a pulmonary phthisis.

UPON the whole; if the remedy here proposed, when early applied and properly directed, (for on both these its success intirely depends) shall be found effectual, it will immediately and

\* In a comparative way, these characteristics in the human subject are analogous to those which we frequently observe in the skeletons of some horses, that are said to be deer-necked, high at the withers, and goose-rumped; all which usually indicate more activity of spirit than strength of constitution; for they are ordinarily found to be washy upon the road, and subject to coughs; in short, (as the jockies term it) they are generally without bottom. To this peculiarity of make the breed of running horses are much disposed; and they are accordingly better calculated for short and temporary exertions than for the continued fatigue and labour of the chace and road.

and radically cure a complaint very troublesome and fatiguing, as it frequently harrasses the patient some weeks ; and if, moreover, we examine the bills of mortality, and there see the numbers who are annually swept off by consumptions ; or if, from physical experience, we remark how greatly this disorder swells the catalogue of chronic complaints ; if, at the same time, it is true that this dreadful disease, peculiar to the tender and delicate, ordinarily takes its rise, in this capricious climate, from the very disorder in the lungs for which, in the early state of it, the proposed remedy is a certain and expeditious cure : whoever, I say, considers this, will, I hope, dispense with any further apology

logy for the loss of time this information may occasion him.

I SHALL not enlarge upon the probability there is that one part of this curative process, the use of the Inhaler, may be extended to other beneficial purposes, though it by no means seems ill adapted to some species of asthmas, or, perhaps, even to peripneumonic complaints; I do not urge this, I say, not because it is not true, but because, for other reasons, I am anxiously solicitous that it should be principally confined, in conjunction with the other part of the process, to the disorder for which it is a certain, *experienced* cure. For it is much to be apprehended, that a too extensive and capricious application

application may subject this to the common fate of many excellent remedies in the same circumstances, since, as I shall hereafter observe, the disappointments of our unwarranted expectations are but too apt to operate to their discredit; for when a remedy is not found good for every thing, we are most exceedingly ready to conclude it good for nothing.

NOR shall I enforce the importance of the Inhaler, as applying a fatus of any sort in the most effectual way to inflammatory sore throats, or for conveying the powers of antiseptics to putrid ones; because all this may be done, though not so conveniently in adult age, by inhalers of the common construction:

construction : but what gives this a superiority to all others that I have seen, is, that besides the important purpose, hereafter mentioned, of making a parched, feverish skin, relent, and producing a sweat, whenever that evacuation is necessary, this Inhaler extends all its advantages to children, who, for want of skill in the use of the common sort, arising from the necessary interruptions in breathing, have hitherto been deprived of their help.

I AM well aware that neither my time or abilities have been sufficient to furnish out that correctness which is necessary for the public eye---and, perhaps too, I may be exposed to unfavourable criticism, for having digressed

gressed into disquisitions and remarks unconnected with, or at least not essential to, the principal subject of this treatise. To the first I have only further to say, that if the knowledge intended to be communicated is intelligibly conveyed, and found practically useful to the world, my utmost expectations, and indeed wishes, will be answered; and to the latter I would beg leave to observe, that as I have not, under an affectation of medical erudition, insulted the reader's judgement, by retailing what has been said by others; and as the following observations and reflexions, resulting from a long and extensive course of practice, would, if not thus introduced, probably have never made their appearance

ance at all, though I thought the communication of them a sort of a duty, I hope I may, without the imputation of arrogance, expect the indulgence of the candid.

HOWEVER, as the certain success of the proposed remedy depends upon its application to the specific disease to which it is appropriated, I might, as a further plea, add, that in description, one way of shewing what a thing is, is to say what it is not; and consequently, in the view of discrimination, it was even necessary to mark those coughs which originated from other causes, and consequently, for which the remedy was not adapted.

WITH

WITH regard to the first and last chapters of this treatise, I know not how to secure them from the imputation of impropriety, arising from want of connexion, unless they are allowed shelter under the sanction of precedents; if so, it may be remembered, that a late very celebrated author, through a most ingenious train of philosophical reasoning, though he began with tar-water, ended with the Trinity.

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A Radical and Expeditious  
C U R E  
FOR A RECENT  
CATARRHOUS COUGH.

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CHAPTER I.

THE sudden, and sometimes severe, changes of weather to which this climate is subject, are perhaps the most unhappy circumstances attending our situation ; and the pernicious effects of them upon the

B human

human constitution are so frequently experienced, that diseases of the breast may be truly considered as endemical among the inhabitants of this island. We frequently find a warm summer's day succeeded by one as cold and keen as those of February or March ; and, what is still more, even in the same day, the former part is sometimes attended with soft breezes from the south-west, and a warm relaxing atmosphere, loaded with vapour ; when, on the contrary, the afternoon shall be accompanied with a sharp, dry, biting north-east, affecting the body and lungs in the opposite extreme.

IT is impossible but those sudden changes from extremes to their contraries must, in delicate constitutions especially,

especially, be productive of mischief. When alterations of weather from heat to cold, or the contrary, succeed gradually, those salutary powers of accommodation with which the animal œconomy is furnished, may prevent any mischiefs or perceptible disorders; though an alteration in the constitution proportioned to that in external nature must necessarily succeed those changes; but that which might, without inconvenience to the constitution, be produced gradually, will, if too sudden and abrupt, require help, and be felt as a disease; as a man may with ease and safety gradually descend a flight of steps, when a sudden jump from them would endanger his life.

THE disorder we commonly call a Cold is generally supposed to be produced from a sudden check of perspiration, by the action of cold upon the surface of the body or the lungs; and without entering into a specification of the particular complaints arising from it, it is very evident on a general view, whatever is the proper proportion of this discharge to different subjects, or the same subject under different circumstances, that any sudden suppression or interruption of any excretion which is necessary to a sound state of the constitution, must be productive of mischief. It is true also, that as the sum of the perspirable matter is discharged jointly from the surface of the body and the lungs together, any interruption

ruption to the former must throw a greater load upon the latter, and perhaps sometimes more than they are able, or were indeed originally designed to endure. And accordingly, most probably from this cause it is, that we frequently observe in asthmatic patients, especially those who perspire most in summer, that when, by the effect of winter or cold weather, the perspiration from the surface of the body is lessened or interrupted, the lungs seldom fail to complain of the additional burthen, by an increase of the asthma.

EVERY one must have observed in the act of respiration, when the expired vapour is condensed and made visible by the cold air of a frosty

B 3 morning,

morning, or when it is collected by breathing upon cold glass or marble, what a quantity of moisture is thrown off by every successive expiration; we cannot therefore but conclude from hence, that a great part of the perishable matter discharged from the body passes off this way, by the agency of the lungs. Indeed it has been proved that the lungs, in the ordinary state of the animal œconomy, do in fact discharge considerably more perishable matter than the whole body besides; nor is this to be wondered at, since the lungs are so elaborately organized, that Dr. Hales has demonstrated the sum of the surfaces of the vesicles or pulmonary bladders to be more than equal in extent to the surface of the whole body.

WE are not to suppose, however, that this prodigious quantity of humid matter which we see so perpetually discharged in the breath, pervades the bronchia and vesicles of the lungs, when they are distended in a full act of inspiration, under the same form of vapour in which it appears when conveyed off in the act of breathing; for it is first undoubtedly discharged from the blood-vessels into the pulmonary cells as lymph; by which means, at the same time that the necessary discharge of the *materia perspirabilis* is made from the blood, the sides of the vessels also are kept moist and in a proper condition, either for the admission of any, perhaps inexplicable, properties in the air which may be necessary to life, or for the ejection

of something out of the constitution which, though it may escape our notice, would, if retained, be mischievous to it. This humid lymphatic matter is not only found by dissection to cover the surfaces of the pulmonary vesicles, but Dr. Hales has proved by actual experiment, that water injected into the pulmonary artery, passed from the extreme branches of it so freely through the tunics of those vesicles into the cells themselves, and thence into the bronchia, as to flow plentifully thro' the windpipe when it hung in a depending posture. He found also, that though those pores were sufficiently large for a ready percolation of the serous part, they were however too small to receive the dense or globular part of the blood.

THIS

THIS lymph, most probably, constantly sweats through the sides of the vesicles in every position of the lungs, and never suffers a total interruption but in a diseased condition of them. When the chest is most enlarged, and the lungs inflated at full inspiration, it is likely the discharge is then greatest, as the blood moves more freely at that time through the pulmonary arteries, and consequently the serous part of the blood is driven with a greater impetus through the capillary branches into the vesicles; but at the completion of expiration, even when the chest is contracted, and the cavities of the lungs reduced to their least ordinary dimensions, the vesicles are never so much collapsed, but that there is a considerable surface of them exposed,

exposed, and consequently a proportioned evaporation. Of this every person may be convinced by attending to his own respiration; for by voluntarily streightening the cavity of the belly by the contraction of its muscles, and forcing up the diaphragm, a great deal of air will be thrown out of the lungs that was left, and would have remained there, after the ordinary and involuntary act of respiration was finished.

FROM this idea then of so large a quantity of matter perpetually flowing into the cavities of the lungs, where the least intrusion of any fluid is constantly experienced to be so distressing and dangerous; it follows, that if Nature had not provided an effectual method for the complete discharge of it

it as fast as it is formed, the necessary consequences of such an accumulation would soon become fatal.

THE air, then, is the great agent by which this process of evaporation, so essential to the purposes of the animalœconomy, and to life, is performed. The common atmosphere is not only calculated, by its perfect fluidity, to waft off, in the successive acts of respiration, this matter, when it is actually formed for conveyance, into vapour ; but Nature has endowed it with another property essential to the process before us, and which, as it has but lately been well understood, seems not to have been fully considered, in reference to the act of respiration.

PROFESSOR HAMILTON, in a work of genius he some time since published, has, by a number of decisive experiments, and the clearest reasoning deduced from them, demonstrably shewn, that the common atmosphere has in it the property of dissolving water, and in the same manner that water simply dissolves sugar or salt, or that any other substance is dissolved in its proper menstruum: that this property is perpetually operating upon all the waters that cover the face of the earth: that the power of this principle is so strong, that it dissolves water even under the concentrated form of ice. It is observed too, that the activity of this power is greatest when the air is in motion, or in a state of agitation; and that when the water is so dissolved,

the

the quantity suspended by, and its perfect solution and transparency in the air, depends upon, and is in proportion to, the warmth of the atmosphere. He has likewise shewn, that after a certain state of air has dissolved, and retained as much water as it can hold in a state of transparency, a colder condition of the air succeeding, will not keep it so suspended and dissolved, but part with it again in a turbid precipitating state. From these and other considerations, Dr. Hamilton has given a most ingenious and satisfactory account of the rise and descent of vapours, and the formation of clouds, &c. \*

THIS active principle in the air being established, whoever considers the structure

\* Vide Hamilton's Philosophical Essays.

structure of the lungs, and forms an idea of them, with their complement of air, at the time of a full inspiration, cannot but perceive how admirably contrived they are for unloading the constitution of that prodigious quantity of moisture perpetually thrown off from their surfaces.

FOR, first, if the quantity of a fluid dissolved or evaporated in a given time depends upon the surface exposed; secondly, if the activity of the dissolving principle is in a great measure increased by the motion or agitated state of the air; and lastly, if the power of retaining water, so dissolved, is also greater in a warm than a cold state of the air; with these facts in view, I say, we cannot but perceive how

how completely an animal is furnished with an apparatus for the purposes of evaporation, or the discharge of the *materia perspirabilis* from the body.

THE lungs, though totally without the power of motion in themselves, passively follow the successive enlargement and contraction of the chest. In every inspiration the moistened and extensively expanded surfaces of the bronchia and vesicles, expose to the utmost advantage, and with the greatest possible surface, the fluid to be dissolved to the dissolving medium; the power of which is, at the same time, rendered active to a great degree by the two other requisites of heat and motion; after which, by expiration, the

the fluid so dissolved and taken up is successively and completely wafted off.

THIS quantity of humid matter thus discharged, as it is compleatly dissolved in the cavities of the lungs under a distended state of them; so, when it is conveyed by expiration into an atmosphere sufficiently warm to maintain the solution and support its transparency, is therefore unperceived. But, on the contrary, when it is discharged into the chill air of a frosty morning, we can then judge of the quantity, by the turbid and undissolved form in which it then discovers itself.

BY this perpetual ingress and efflux, therefore, of the air, or, in other words, by the stated and ordinary act of respiration,

spiration, which is coeval with the birth, and subsequently as durable as the life of the animal, there is constantly and safely conveyed from the constitution a prodigious quantity of excrementitious matter, which would otherwise, by choking up the bronchia and vesicles of the lungs, very soon, in a way of suffocation, prove destructive to the animal.

ACCORDINGLY, we see the importance of this evaporating process to the animal œconomy, and indeed to the very existence of the animal, by the want of it at the time, or at the approach of death; for the last period to life is generally the immediate result of a defect of this operation. When the vital, and consequently

muscular powers of the animal, are so far weakened, either by age or disease, that there is not a sufficient stock of strength remaining to enlarge and contract the thorax sufficiently for the purposes of complete evaporation, by a full and perfect respiration, which is therefore, with a laborious languor, imperfectly performed ; the whole leakage into the vesicles is, consequently, not conveyed away ; and therefore, by gradually choaking up the cells, and rendering so much of the lungs as it possesses uselessly inactive, it becomes an accelerating cause of distress, till the matter, by a slow and imperfect evaporation, being thickened, and, notwithstanding the weak and ineffectual efforts to dislodge it by a cough, increased at last to such a quantity,

a quantity, as to fill up the larger ramifications of the bronchia, the hastening period to respiration, and the consequent approach of dissolution, is proclaimed by that fatal symptom, vulgarly called the rattle; a sound sufficiently convincing that life is at last terminated by suffocation.

HITHERTO we have seen only, that one great use of respiration is that of discharging a large quantity of matter from the lungs, which we may call excrementitious, as it is no longer necessary to animal life, and which therefore, if retained in the blood, would undoubtedly be prejudicial to it. I cannot, however, help taking notice of another striking advantage arising from respiration, though per-

haps it may not be essential to the subject before us; and that is, the necessary ventilation of the blood, or that refrigeration which it perpetually stands in need of, and actually receives in respiration.

WHATEVER is the cause of animal heat, we have the greatest reason to suppose, that if the effects of that principle were not counteracted, and at times powerfully too, by a perpetual influx of air into the lungs, the blood would frequently acquire such a degree of heat as would prove destructive; for though the circulation of the blood may not, possibly, be the cause of, yet, however, it generally keeps pace with, the heat of the animal, and the in-draughts of air are in proportion

proportion to the former ; i. e. *cæteris paribus*, the respiration keeps pace with the pulse, when the rapidity of the blood is increased, either by exercise or the preternatural exertions of the heart in a fever.

WHEN an animal is engaged in great exercise, or a continued violent action of the muscles, as in running up hill, &c. just in the proportion that the circulation is increased for the purpose, perhaps, of supplying so much motion, or so great a consumption of strength, we find the respiration is quickened to keep down the increasing heat. For this reason, therefore, if in a fever we should not chuse to disturb a sick child in its sleep by the touch of the pulse, a pretty certain

judgment of its velocity may be formed by attending to the increased or diminished respiration.

A PERPETUAL influx of fresh cold air has undoubtedly a tendency, by the mode of simple contact only, to communicate the degree of cold possessed by itself to all the adjacent parts to which it is applied ; but if we reflect upon the density of the matter to be cooled, and consider how rare the substance is that is acting upon it, the specific gravity of blood to that of air being as 841 to 1, it should seem that the coldness of the air, simply considered, could not be at all times adequate to the important purpose of refrigeration, more particularly when the heat of the body is increasing fast.

If

If the heat of the blood in this climate, and in the ordinary state of it, is set down at 98, and a man can support himself, and live in a state of health and ease, when the thermometer is at 75; what great degree of cold can the air communicate to the blood, when the density of this to that is at 84: to 1, and the active principle of cold in the former but 23 degrees greater than that in the latter?

IN the island of Jamaica, when the thermometer stands under 76, the weather is considered as cold, and the inhabitants guard against it by additional cloathing; but the ordinary state of the mercury in that climate is from 82 to 86, or 88, though it sometimes rises to 96; and I have been

credibly informed likewise, that in Bengal the thermometer has been known as high in the shade, and under a tent, as 108. In those circumstances, therefore, supposing them at all permanent, or that the mass of the whole body was capable of being soon brought to the temperature of the external air, upon the same principle of simple contact, the effects of the heat on the blood would, undoubtedly, soon be fatal.

WHENEVER heat or cold is intended to be communicated by one body to another, we see, in a thousand instances, how much depends upon the different densities of the agent and the subject of its operation; and if a dead body, perfectly cold, were to be immersed

immerfed in air of any determined heat, and fo circumftanced, that it could receive no increasing warmth by any kind of contact with a matter of greater density than air; we should find the progress of its influence upon fo large and fo lid a mass would be exceedingly slow; but it certainly requires, with the fame medium, as much time to cool a mass that is warm, as it does to warm the fame volume of matter when it is cool. And therefore, as the air, on account of its rarity, would require a very long time before it could act fo effectually upon the body, as, in a way of refrigeration, to reduce its pernicious heat; fo, on the other hand, when the heat of the air happens to be equal or fuperior to the blood, as in the instances above-

above-mentioned, the same want of density prevents it from imparting to the animal mass a degree of heat which would be destructive to it; i. e. as those extreme degrees of heat in the air are generally temporary and short, so that medium is happily disqualified by its tenuity for producing its pernicious effects, before it is reduced back to a more innocent temperature.

THOUGH by the ordinary act of respiration, therefore, by a constant and uniform application to the sides of the lungs, the air could be supposed sufficient, by a communication of its temperature, to perpetuate the degree of heat which the animal ordinarily enjoys, in a tranquil state of health, and in the mean exertions of

of the heart, it certainly, however, is not in the power of so rare a substance, by simple contact only, to check a rapidly increasing heat of the body from sudden and extraordinary causes ; and much less when the heat is actually so increased, to reduce it back to the common standard, with that expedition which we frequently experience.

THIS refrigeration then, so essential also to life, must arise from, or at least be assisted by, a more active principle than the cause above-mentioned ; and it seems very clear, that some late discoveries have amply furnished one, though it has not been applied to the purpose before us.

FIRST, then, simple evaporation is now well known to be productive of actual cold in the matter or substance to which the evaporating fluid is applied ; and that too, in certain circumstances, to an extreme degree. How, or by what means, it produces this effect, is perhaps inexplicable ; however, the truth of it being demonstrably proved by a great number of experiments, we may certainly avail ourselves of the fact, upon the principles of a well-grounded analogy.

SECONDLY, It is observed, in experiments to this purpose on the thermometer, that the cold produced is but of short duration ; and, therefore, as the continuance of the generated cold

cold is only during the evaporation, the more volatile the matter is, the more frequently the bulb of the thermometer must be moistened with it, if the degree of cold is meant to be continued or increased; otherwise the mercury will again acquire the general state of the circumambient air, and return to the degree at which it stood before.

THIRDLY, that *cæteris paribus*, the more volatile the fluid, the quicker the evaporation, and of course the greater degree of cold produced by it in a given time; yet this will not hold good with fluids in different circumstances; for, if the evaporation of an aqueous or less volatile fluid, can by any means be rendered as expeditious

ditious as that of another in its nature more spirituous, the degrees of cold produced by both will be the same ; unless, as Dr. Cullen has observed, the ball of the thermometer be moistened with any of the fossile acids ; for then, on the contrary, a degree of heat is produced, the cause of which is probably their attracting water from the air ; for those acids mixed with water are known always to produce heat : these therefore, though they counteract the effect of evaporation, are no objection to the fact before us.

FOURTHLY ; ventilation, or a current of air, is known by the hastening evaporation to increase the consequent cold to a very great degree. Accordingly,

dingly, the moment the bulb of the thermometer is moistened with a volatile fluid, the evaporation is hastened, either by nimbly moving it to and fro in the air, or by the blast of a pair of bellows; and the degree of cold produced is then not only greater, but greater in proportion to the suddenness of the evaporation.

FIFTHLY, and lastly; it is found by experiment, that the effects of evaporation, as producing cold, depend in a great measure upon the heat the body possesses that is to be acted upon; insomuch, that the same degree of evaporation produces a greater degree of cold upon a warm body than upon one that is colder. Thus, if the thermometer stood at 80, the evaporation

ration of the spirit from one immersion or moistening of the bulb, would sink the mercury considerably more than if the experiment were made upon the instrument, when, in a colder state, it stood at 40. The cold, therefore, which is caused by evaporation, or rather the effect produced by it in the body to be cooled, is in a certain increasing ratio to the warmth of the latter.

THUS much being premised as to the foregoing principle of cold from evaporation, and the observations relating to it being established ; from these data the following consequences, with regard to animal respiration, will necessarily follow.

FIRST,

FIRST. The whole body of the lungs, and of course the blood contained within them, must be necessarily subject to the influence of, and consequently be cooled by, that rapid evaporation from their surfaces, which is necessarily produced in respiration; and this for the same reason, whatever it be, that the thermometer demonstrates the effect of this principle by the sudden fall of the mercury during the evaporation of a fluid with which its ball had been moistened.

SECONDLY. As constant evaporation is necessary, if the cold is meant to be perpetual, so we see that in animal life, where there is a necessity for the perpetual operation of this principle, the process of evaporation commences

THIRDLY. Since in a given time the degree of cold produced depends upon the expedition with which the fluid evaporates; so, though the matter in the lungs which is to be evaporated is of a lymphatic or aqueous kind, and therefore not in its own nature at all volatile, yet if its sluggishness can by any means be so far overcome as to render its evaporation equally expeditious with that of a fluid possessing greater volatility, it will become as proper for the purpose of refrigeration as the latter.

FOURTHLY. This effect is produced by ventilation, as it evidently hastens

hastens evaporation, and by that means eventually increases the cold resulting from it : it is therefore scarcely possible to conceive an apparatus more completely calculated for this purpose, than the lungs in the act of respiration, as by their means the effect of ventilation on the evaporating fluid is very considerable, as well as perpetual.

AND, lastly, As the cold produced by evaporation affects the subject operated upon in proportion to the degrees of heat already possessed by it, the operation of this principle is of the last importance to animal life, since the effect of it will always keep pace with the demand there may be for its aid : for when by very great labour or exercise, or the preternatural

exertions of the heart in a fever, or by any other means whatever, such a rapidly increasing heat is produced, as would, if not kept under, very soon prove fatal to life; the respiration at the same time being always proportionally quickened, the evaporation, and the consequent cold produced by it, will not only be more constant, but the effect of that cold upon the blood will be greater; so that the degrees of its activity will be exactly proportioned to the aid the animal then stands particularly in need of, from this important principle.

INDEED, if the thermometer had not given us those demonstrative proofs of the power of evaporation in producing actual cold, one should have

have supposed that our own feelings might have been sufficient to have convinced us of the existence of the principle. Whoever has dipped but his finger in spirit of wine, or has accidentally had any of it spilt upon his hand, or on his head after close shaving, must have perceived a very sensible cold produced as it was drying off.

THE different degrees of cold sometimes perceived, and always produced, by the evaporation of fluids of different volatility, may, perhaps, be one reason why the being wet-shod with, or falling into fresh water, so often, by checking perspiration, produces a cold, when the same accident with salt water is very seldom known to be attended with that inconvenience.

IT might be worth inquiring also, whether the agreeable coolness which a feverish patient enjoys after a sweat, or when it is drying off or evaporating from the body, may not, in part at least, be owing to the effect of this principle, as well as to the tranquillity supposed to be superinduced by the critical discharge of a matter offensively stimulating to the constitution.

THE application of the foregoing facts to respiration is so obvious, that I shall enlarge no farther upon it, nor attempt to enforce a truth so very evident. After, therefore, remarking that, besides the purpose of discharging the *materia perspirabilis* from the body, and observing that it is impossible to conceive an apparatus more completely

completely formed for refrigerating the blood, as far as the principle of evaporation is effectual to that purpose, than the lungs under the constant and perpetual act of respiration, I shall conclude this subject with the following reflexion.

IN our attempts towards the examination of causes and effects relating to the animal œconomy, we are too apt, in a confined way, to conclude, on the discovery of some few which stand most obvious to view, that we are arrived at a perfect discovery of the subject in question, and accordingly to flatter our pride with the triumph of a complete investigation.

BUT, to instance in the subject before us; however great, and indeed essential to life, those advantages are which the animal œconomy derives from the lungs in the instances of evaporation and refrigeration, we cannot suppose, much less conclude, that the whole use of respiration is confined to those, or any other individual purpose; for there is the same difficulty, and indeed impossibility, attending a complete investigation of all the advantages the animal receives from respiration, that there ever will be in accounting adequately for any other phœnomenon in nature.

THE wonderful texture and complicated organization of the lungs, as well as a thousand latent properties of the

the air, besides those more obvious uses, are without doubt wisely contrived for imparting to the blood properties which may always be essential to it; or for discharging invisible mischiefs from the constitution, which, if retained, might be destructive to life.

SUCH is the union and intimate connexion between all the agencies concerned in animal life, that a perfect solution, or an adequate account of any one thing, must ever necessarily depend upon a thorough knowledge of every thing. All, therefore, that we can expect to arrive at in investigations of this sort, is the detection of causes and their effects which stand most exposed to the cognizance of our senses; but there ever will remain

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main an infinity of others, equally essential, which, necessarily resulting from the complicated structure of a machine under the influence of animation, can therefore never be perfectly comprehended till the whole of the animal, and all the principles essential to life, are thoroughly understood.

**C H A P.**

## C H A P. II.

THOUGH the lungs and 'air are admirably contrived, and the whole process of respiration most wonderfully adapted to the purpose of discharging so large a quantity of excrementitious matter from the blood, their powers, though great, must necessarily be limited; and accordingly we frequently find the lungs, though without any vice in themselves, complaining by a disease of a load of matter with which they are oppressed, and with difficulty dispense. This is the case in those Coughs which are caused by obstructed perspiration, simply considered; by means of which the lungs are

are either oppressed with a greater quantity of the fluid than they were formed to discharge, or else the leakage in them becomes of such a sort as may not be reduceable to vapour; and in either of these cases it must be thrown off, if it is discharged at all, by unnatural and violent efforts.

BUT when this important organ, so essential to respiration and to life, is itself diseased, we cannot wonder if fatal consequences frequently result from it.

IF the lungs, either from an original fault in their make, or a certain vice in the constitution, are attacked by tubercular swellings, a mischief to which they are sometimes subject, or  
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are infested with gritty calculous concretions in the bronchia, a complaint to which they are likewise sometimes exposed, the organ discovers the disease, and is stimulated by the consequent irritation into a petulant, useless cough, which, as it cannot discharge the cause, serves only to increase the evil that produced it.

WHEN those little partial abscesses first affect the lungs, they are not only attended with a symptomatic fever accompanying each successive suppuration, but those knotty tumours are, in another respect, mischievous even before suppuration: for by obstructing the regular circulation of the blood through the small, and indeed sometimes larger branches of the pulmonary

nary vessels, they produce a distension of their sides, which by this means becoming thin and weak, frequently burst during the violent exertions of the cough ; the consequence of which is an hæmorrhage, always alarming, and sometimes fatal. As the disease advances, the tubercles increase both in size and number ; so that the suppuration, in some one or other of them, being perpetual, the fever becomes a constant hectic ; and as one mischief is always productive of others, the parts of the lungs which are infested by the swellings, and those likewise in the neighbourhood of them, become useless ; for the vesicles, instead of expanding freely in respiration, and exposing their contents to the air for the necessary discharge of the ordinary leakage

leakage into them, inactively suffer it to be pent up, till by the heat it is there constantly exposed to, and the consequent gradual evaporation of its thinner parts, it becomes not only thick, but frequently so acrid, as to corrode the tender substance in which it is lodged. The increasing quantity of matter therefore which is expectorated in the advanced stages of the disease is not wholly pus, as it does not always arise immediately from the discharge of the tubercles themselves, but is, from the cause mentioned, certainly the consequence of them. Towards the close of the disorder, so much of the lungs is either wasted into, or deluged with purulence, that they are incapable of performing the office for which they were intended, or of discharging

charging the perspirable excrementitious matter from the blood; and nature, therefore, reduced as it were to the last shift, in order to rid the constitution of it, forces it off by preternatural exertions through the skin or guts, in a colliquative sweat or a diarrhœa, either of which constantly and necessarily returns on the suppression of the other. When, therefore, at last, the organ is not only rendered, by the increasing disease, perhaps totally unfit for the purposes of life, but the disorder, besides those colliquative evacuations, is accompanied also with a perpetual wasting hectic, a large expensive expectoration, and other consequent effects, which become so many causes of a decay of flesh and strength, it is

no wonder that, amidst these dreadful circumstances, death puts a period to so many accumulated evils.

IN the early state of this disorder, before the lungs are greatly injured by the number of tubercles, or those, not having advanced to suppuration, are attended only with a petulant, dry, husky cough; next to occasional bleedings, cooling and refrigerating medicines, great temperance, and such other means as have a tendency to preserve the circulation in a tranquil state, perhaps the greatest benefit will be found to arise from scapulary issues, assisted by a vegetable diet and asses milk; but then I cannot help observing, that if the discharge of the issues is expected to do any thing of conse-

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quence, there ought to be a just proportion between the remedy and the disease: the discharge therefore should be rendered so considerable, that it may be felt; or rather, if I may be allowed the expression, it should so far take up the attention of nature, as that a revulsion may be made from the lungs, and the evil diverted from so fatal, and perhaps habitual, a channel.

IT is much to be apprehended that this species of relief by revulsion, where either by the stimulus of external pain, or a discharge of something offensive to the constitution, the evil is meant to be diverted from a noble part, has lost much of its character and credit through an ill-timed tenderness, or modern refinement; by which

which means the cautery of the antients is trifled into a perpetual blister, scarcely larger than a crown, or dwindled into an issue that will hold scarcely more than a single pea.

I WISH indeed there may not be too much reason to believe that medicine in general may with equal justice be subject to the same criticism; and therefore, though it is not essentially necessary to the subject in which we are engaged, it would perhaps be worth while to step aside, and inquire how otherwise it should come to pass that so many articles in the catalogue of the *materia medica*, furnished and recommended by the experience and concurring testimony of many successive ages, should not practically answer

the characters given of them? For were we to take upon trust the virtues ascribed to the various articles with which our dispensaries are furnished, it should seem that there would be few diseases to which the human body is subject, for which we should not consider ourselves as possessing an infallible specific. This, however, is certainly very far from being the case; for the regular practitioner has frequently the mortification, not only to find disorders that he does not cure with these medicines, but not unfrequently also to see those very patients, for whom he has unsuccessfully prescribed, nevertheless radically cured by empirics. Whenever this happens, the curiosity of the world is excited towards a discovery of the remedy by

by which the cure was effected ; but being known, it has constantly appeared to be a medicine purely officinal, with which we are familiarly acquainted, and have tried in the same case ; so that the discovery, most commonly, only serves to convince us that our expectations from it were defeated by trifling with its dose, and by not sufficiently considering that it is impossible frequently to produce such an alteration in the constitution as shall be necessary for the cure of a disease, without using a remedy, or at least such a dose of it as, under an improper direction of its virtues, may be capable of doing mischief. This has been exemplified by the large dose of scammony in Dover's hydragogue electuary ; and upon this

consideration was Sydenham's complaint of the want of success from very small doses, justly founded on the first introduction of the bark into practice.

AN enumeration of instances would be endless: I cannot help, however, briefly relating one very extraordinary case, which is that of a lady of this town, who, some years since, laboured under a confirmed catalepsy, with which she had been afflicted many months. It is necessary to premise, that there was no one circumstance attending the state of her constitution that could probably give rise to her disorder. She had sometimes two or three seizures of this formidable convulsion in twelve hours, without the least previous notice. While she was standing, frequently

quently indeed when she was talking, she would be seized with an universal spasm, which fixing the whole body quite erect, and, in whatever position they chanced to be, rendering every limb, even to the ends of the fingers, as stiff as if they had been made of whalebone, exhibited, if I may express myself so, (for the respiration continued of course) the most awful appearance of death alive, or a person possessed, that can be conceived. In this situation she would remain motionless upon her feet, with her eyes open, perhaps an hour, and sometimes longer; nor when the conjunctiva of the eye was touched with the finger, would the eye-lids tremble; till at last, when the universal spasm ceased, totally exhausted and relaxed, she

would drop as suddenly as if she had been shot through the head ; and on this account, an assistant, with his arms extended, was always in waiting to receive her in the act of falling. The heart, during the paroxysm, seemed to be affected greatly, for the circulation was languid, and the pulse weak. If an arm happened to be extended at the time of the invasion of the fit, it remained so during the whole of it ; and if any force was made use of to alter its position, the ineffectual violence seemed always to give an uneasiness, which was discovered by a vibratory motion of the eye-lids.

THIS lady had been long under the care of the late Dr. Huxham for this formidable disease, without finding the least

least relief; though, as may be supposed, the most efficacious medicines of the nervous tribe had not been neglected, and among the rest the powder of valerian was principally depended on; but it is to be observed, that it had been given only in 3fs at a dose. As a long course of this and other medicines had been totally ineffectual, insomuch that the disease seemed more and more confirmed; and as I had heretofore seen a case of this kind in St. Thomas's Hospital, where the cure was effected by very large doses of this medicine, I advised a similar trial of it; the consequence of which was, that the patient had her resolution and patience rewarded by a perfect cure. She took of the valerian in substance half an ounce at a dose, twice

twice a day, and did not discontinue the medicine till she had taken to the amount of seven pounds.

As we have just now mentioned the bark, if I might be permitted to extend this digression a little farther, I would observe that, besides the discredit which many medicines, recommended to us as possessing specific virtues for the cure of particular diseases, have fallen into from the above cause, it must be confessed also, that most of them, in their turn, are unhappily subject to the operation of a concurrence of circumstances, which seldom fail in time to rob them of those very virtues from which they derived their original credit. To instance only in the bark: this substance

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was, most probably by accident, discovered to possess the real virtues of curing an intermitting fever; and, as subsequent experience has demonstrated it to be a most noble and useful medicine for this purpose, one should have naturally concluded that its reputation would have been secure; but, unfortunately, there is great reason to fear that this very reputation becomes the cause of, and is operating towards its discredit. For, first of all, as soon as the medicine became celebrated, its increasing consumption became a temptation to the venders to adulterate it. Accordingly a great deal of sophis- ticated and adulterated bark has at times been put into the hands of practitioners.

IN the next place, this famous simple claimed the attention and excited the curiosity of the chemists, who paid it the honours of analization, attempting by this means to discover the principles in which its efficacy resided, at the same time that they chose to furnish the prescriber with forms of greater elegance; and accordingly it was manufactured into those of decoction, tincture, and extract. But unfortunately, as we are unable adequately to account for its operation, and are therefore not thoroughly acquainted with those principles to which it was indebted for its character, the medicine becomes, by these means, exposed to the risque of being deprived of them. And, lastly, the practitioners, in their turn, became dissatisfied with

with prescribing it in a vulgar form, or limiting the use of the medicine to the complaint for which it was first discovered to be a cure, and from whence it derived its credit; so that it is not only refined upon, by varying the mode of administering it internally under all the above-mentioned forms of decoction, tincture, and extract, and topically by fomentation, by quilting it into stomachers, &c. &c. but added to all this, I say, the use of it hath been, upon the credit of speculation, extended to a variety of disorders to which perhaps it never was adapted, at least to the cure of which it certainly was not indebted for its character as a medicine.

AND what must be the result of all this? Why, only that the original medicine

medicine becomes answerable for all the consequences of our modern whimsical refinements, as well as of all those other causes which are operating towards its discredit: for as soon as ever it is found, from its maimed condition and injudicious use, not to answer our unreasonable expectations, it is then wisely discovered not to be good for every thing; and the very next step to that comes the usual conclusion, that it is good for nothing.

THUS may an excellent medicine fall into disrepute, and for a long time support its memory only by a monumental record in our dispensaries, till chance, or the practice of an empiric in succeeding times, again revives its credit, by a proper, and perhaps simple, administration of its virtues.

To

To return from this digression to the subject of scapulary issues.

THE good consequences of a proper discharge of this sort, in pulmonary complaints, I have not only in many instances seen, but have actually experienced to a very remarkable degree in my own person.

IN the early part of my life, with a constitution rather tender, and inclined to a hectic, I fell into a very formidable disorder of the lungs, attended with a dry cough, great oppression upon, and shooting pains through my breast; a hectic fever, accompanied by a spitting of blood, which continued several months; flushes also after eating, and the usual parched scalding feel of the palms of the hands and soles

soles of the feet; and, as a consequence of all these, a wasting of the flesh to a very considerable degree. After numerous bleedings, the use of the cortex, a long course of the Bristol waters upon the spot, and the various tribe of balsamics, to no purpose, I had, by means of a caustic, a large issue of between two and three inches diameter, and which afterwards held between forty and fifty peas, opened between my shoulders. When the slough separated, and the discharge became complete, I soon felt the good effects of it, in the abatement of the irritation in my lungs, the total removal of the load from my breast, and, in no long time, a relief from all my other complaints; which, by continuing the discharge some considerable time, never returned.

THIS drain was from the beginning assisted by asses milk and a vegetable diet, the latter of which was persevered in near a twelvemonth after.

By these simple, but important means, a successful period was put to a very formidable disorder, which, I am well persuaded, had the stress of treatment rested on the tribe of balsamics, would have ended fatally.

IF any great dependence is placed upon, or real service expected from a course of asses milk, it is necessary that this also should not be trifled with. If the bowels will bear it, it certainly ought to make the greatest part of the patient's nutriment; and indeed, by this means, I once saw an obstinate

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induration of the whole breast entirely removed, notwithstanding it was impenetrably hard, and, including all the characters of a scirrhus but the lancinating pain, had resisted every other means of dispersion. In this case the patient was constantly supplied with the milk of two milch asses, for it made, except a little fruit, the whole of her nutriment. Indeed, if one considers the matter closely, the good effects of such a diet, when pushed to this extent, are not to be wondered at; for there is certainly such a principle of renovation in the constitution of an animal, that if the cause of an evil is once removed, there is a perpetual effort in nature to reinstate itself, by the removal of the morbid effect; and of whatever kind the fault in the habit

is which gives rise to a disease, it is improbable that it should be supported when the whole food or fund of accretion, consisting of so soft and bland a nutriment, carries no principles of acrimony with it into the constitution.

AND here I cannot help animadverting to the very little service that can reasonably be expected, and, to say the truth, ever is experienced to arise in this disorder of the lungs from balsamics, or those substances which may have been supposed to possess detergent or healing virtues. Our ideas of the efficacy supposed to reside in the resinous or terebinthinate tribe most certainly took their rise from the effects they have been observed chirurgically to produce upon wounds on

the surface or external parts of the body. But however apparently useful their detergent or healing qualities may be when actually applied to the surface of ulcers or wounds, that surgeon would be thought surely to practise from a very coarse analogy, who should attempt to cure an ulcer in the leg by conveying his application into the stomach ; for, in fact, after the medicine is mixed with the aliment in the stomach, the chyle in the guts, and the whole mass of blood, there is as large a share of it conveyed in the round of circulation to the extremities as to the lungs, and perhaps not one jot of that in which its external efficacy consisted ever reaches either.

NOR, unless actual experience confirms the contrary, should it seem very probable

probable that antiseptics, topically applied to the lungs, should, in this mode of administration, be possessed of the salutary powers ascribed to them, since the reasoning here also upon which this practice is founded does not appear to result from a just analogy. We are not here concerned with that disposition to actual rottenness which is produced by a sea-scurvy; and unless it can be made appear that the ordinary cause and process of putrefaction in a dead body are the same as in the parts of a living one under a state of purulence, where the principle of life is concerned in the process, such a conclusion cannot certainly be drawn, as it is much less than probable that the same effects from an application should follow in subjects so differently circum-

stanced, and between which therefore no well-grounded analogy seems, to subsist.

IT might likewise be observed with regard to the spitting of blood, so frequent in this disordered state, or other tendernesses of the lungs, that in this complaint also, as well as many others, we seem to draw false speculative consequences from the effects which medicines produce on the palate, as well as on the external parts of the body. The bark, with the addition of elixir of vitriol, for instance, as well as the tribe of astringents, were undoubtedly first recommended for an hæmoptoe, from the testimony the palate gave of their several qualities; whereas, were they in fact to pass into the blood with

with those corrugating powers unaltered, by which they are cognizable to the sense, they would be so far from answering the end proposed, or producing salutary effects, that the use of them would be attended with mortal consequences. This an injection of a few drops of elixir of vitriol into the blood sufficiently demonstrates. However safely, therefore, this information of the sense may be trusted for their similar and good effects upon the first passages, the stomach and guts, by the time that those medicines, or the supposed virtues of them, reach the circulation, the original qualities which they possessed, and by which they were known to, and for which they were recommended by the taste, are lost. All this, however, though certainly

true, is notwithstanding no proof that the bark, with elixir of vitriol, is not an efficacious medicine for a spitting of blood ; but it is very certain, from these considerations, that they do not produce their effects agreeably to our speculative notions, or in the manner a styptic operates externally, by corrugating and pursing up the mouth of a ruptured vessel in the lungs, but by virtues, of whatever nature they are, which those medicines have been *practically* found to possess. The bark, being rendered more active and efficacious by the elixir of vitriol, most probably cures this complaint, by taking off the latent hectic fever, of which the hæmoptoe is a symptom, and upon which the continuance of it depends.

WITH

WITH regard to the species of pulmonary phthisis now under consideration, the truth of the matter seems to be this, that the disease, though so very formidable, never becomes, however, certainly fatal, till the morbid state of the lungs is complicated with, or produces, a bad habit of body.

WE see, when the juices of the constitution are in a sound and uncontaminated state, and the renovating principles of nature are therefore active and vigorous, that in the largest recent wounds skin and flesh are formed, not by any particular creative virtues in the surgeons applications, but from certain powers of renascence existing in the constitution ; for those medicines will no more produce those effects

fects in a living subject with a certain depravity of the habit, than they will in a dead body. Accordingly the public hospitals perpetually afford us instances of the truth of this, even in large foul ulcers, which, provided they are unaccompanied with caries, generally heal of themselves when patients are committed to the bed, and by means of an horizontal posture, the leakage from the superior parts of the body does not irritate the wounds. However, if in these circumstances they do not heal, the surgeon cannot cure his patient till the habit of body is first mended.

THUS, in injuries of the lungs, nature has not left an organ so important, and indeed so essential to the very being

being of the animal, though exposed to accidents, yet totally unfurnished with the powers of reparation ; for even here, where the habit of body is good, wounds, and considerable ones too, are not always mortal, but sometimes heal of themselves, and not unfrequently as expeditiously as those on the external surface of the body. This we frequently see in those who have had the misfortune to be shot or run through the lungs, as well as in the case of many other slighter accidents from ruptured vessels ; for in a healthy subject, provided the great vessels escape, those accidents are seldom attended with fatal effects.

REMARKABLE instances of the spontaneous cure of very considerable injuries

injuries of the lungs are sometimes seen, not only where the injury is received in a state of health, with a good habit of the body, and where there is an active disposition in the constitution to remedy accidental defects; but we are not without examples, where very considerable complaints in the lungs, which had taken their rise from, or at least during a fault in the constitution, have however, upon a salutary alteration in the habit, healed of themselves. An extraordinary case of this sort I remember once to have seen in St. Thomas's, in a patient of Sir Edward Wilmott. Whether the disorder began before his admission, or commenced during his residence in the hospital, I do not now recollect, but the man however fell into

into a pulmonary phthisis. After spitting off large quantities of pus, attended with a hectic fever and colligative sweats, he was at last reduced to so weak and emaciated a state, that all probability of physical relief being at an end, and his death daily expected, he ceased being particularly attended to at the ordinary visits of the ward. The man, however, lived on ; and at last, contrary to the expectation of every one, the disease seemed not only not to gain ground, but appeared to afford some slight indications of a possibility of recovery. The purulent discharge evidently abated ; his night sweats were less profuse ; the quick and palpitating pulse began to be more quiet and distinct ; and some little appetite returning, his countenance and

and eyes seemed to promise some hopes of returning life. These very extraordinary and unexpected appearances engaged the attention of his physician, who recommended a diet suited to his circumstances, and advised him to remove into the country. About three quarters of a year after, this very patient was again admitted into the hospital for a complaint in his leg, though otherwise in perfect health; and during his residence there, was unfortunately seized with the small-pox, and died. As his former cure had been so very singular, the body was opened, when it appeared that, during his consumptive complaints, the greatest part of the right lobe of the lungs had been totally destroyed, and that, consequently, respiration had principally been performed by the left.

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FROM these, and other instances to the same purpose, we must conclude that nature has provided the same common means for repairing accidental injuries and defects of the lungs, and those of the external and less important parts of the body ; but there subsists, however, this essential difference between them. These, when complicated with a contaminated or bad habit, though they will not heal, are not *therefore* fatal ; but those, when they do not heal, become mortal, because the organ that is the subject of them is essential to life.

WITH regard to medicines of the balsamic class, if ever they become really useful, one should suppose that they would be so by topical application,

tion, i. e. by inhaling the virtues of them ; since under this mode of administration, their more volatile parts are actually applied to the internal surface of the lungs, and therefore stand a very great chance at least of coming into contact with the diseased part : it is possible therefore there may be instances, now and then, where the balsamic property of the blood being not destroyed by a bad habit, this manner of application may be useful.

ACCORDINGLY, though the instances are not sufficiently authenticated, we are told that patients in the above circumstances have been sometimes recovered by inhaling smoke from resinous substances ; and indeed I saw myself an instance where there was  
great

great reason to believe that a patient who had suppurations in his lungs, and spit up large quantities of purulent matter, so fœtid that he became nauseous to his nearest friends, received great benefit from this mode of applying the vulnerary virtues ascribed to this class of medicines. The patient was ordered to sit in a very small room, which was filled with the smoke of the common rezin, by now and then sprinkling a little of it upon a hot iron, and this he continued to do twice a day for a fortnight. The patient recovered perfectly. But as this application to the lungs was made on his removal into the country, and it was therefore uncertain how far the change of air (though I never saw it produce so remarkable an event) might be instru-

mental towards the recovery ; and it being but a single instance also, I do not mean to draw any certain conclusion from it.

HOWEVER, I have often thought that upon no other principle can the good, and sometimes speedy effects which consumptive people have experienced from sea voyages, be accounted for. That change of air should be sometimes useful in disorders of the lungs, is not to be wondered at, when we consider the heterogeneous nature of the common atmosphere, and how very different it is, in different situations, from the various exhalations peculiar to each soil ; and we accordingly find these varieties severally proper for different constitutions, under

der different complaints. There are therefore undoubtedly incomprehensible powers in animal nature by the instrumentality of the lungs, that great medium of correspondence between the animal œconomy and external nature, to avail itself of those properties in the air which may be necessary to the peculiarities of the constitution. For this reason most certainly it is that a journey to a distant country, pursued through different airs, is often much more salutary than daily rides of an equal number of miles in the same air. The great influence of the change of air is in no disorder of the lungs more apparent than in the whooping cough, where several successive changes are necessary, and almost always complete the cure. After

the patient has been ill about a month, (for he will receive little benefit till the disorder is completely formed, and at its height) the advantage of the first change of air is almost always perceived : but the good effects of that single change are limited ; for those peculiarities belonging to it, which are necessary to the then disordered state of the constitution, in a very few days seem as it were to be exhausted, and to have done all that is to be expected from them ; so that the cough is again at a stand, and the patient advances very little farther towards recovery. But if, every four or five days, he is removed into a different situation, each successive change will be followed by a very sensible advantage, and by this means a speedy issue is generally put to the disorder.

ALL this is intelligible enough, as the advantages received evidently depend upon a real difference in the quality of the air in different situations; but the good consequences of which a sea voyage is frequently productive, cannot arise from this consideration; for if it were owing to the one great change from a land to a sea air, residence on a small island, or the extreme parts of our own, or indeed a removal to any part of the sea-coast, would be attended with the same advantages, which is certainly not the case. Nor can the good effects of the voyage arise, the influence of different climates excepted, from a conveyance to different or distant parts of the ocean; because the sea air being uniform, the sameness of its exhalations

tions does not furnish out the same variety of resources, so necessary to the particular circumstances of a diseased constitution, as are to be found in the air at land.

THE recoveries which are sometimes seen in pulmonary consumptions, by means of sea voyages, may indeed be partly owing to a salutary alteration in the constitution in general, arising from the effects of a better and warmer climate; for a very considerable increase of the general external perspiration will undoubtedly take off a large share of it from the lungs, which cannot but be of the utmost consequence, as by the morbid condition to which they are reduced, they are not equal to the task of conveying from the blood  
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the ordinary share of that excrementitious matter which nature has allotted to them. This therefore, by gradually reinstating the purity of the blood and juices, may again restore the renovating principle, or, to express it chirurgically, may, by altering the habit, produce that disposition which is so essential to the healing of wounds in every part of the body. However, though this is a very important consideration, I am inclined to believe, and especially from the sometimes sudden effects of sea voyages, that the salutary influence of climate is greatly assisted by another circumstance of perhaps no less weight, which is, that on shipboard the patient lives in, and is therefore perpetually inhaling, night and day, an atmosphere fraught with the

volatile parts of all the resinous and terebinthinate substances arising from the ship and its furniture, which are supposed to be so peculiarly adapted to a morbid state of the lungs ; and affect them likewise, under those circumstances, by the best mode of application. This consideration therefore coming in aid to, and coinciding with the salutary alteration arising in the habit from the perspiratory influence of a soft and warm climate, is perhaps the real cause of those sudden and happy changes attending sea voyages in this species of pulmonary complaints.

BEFORE I quit this part of my subject, as a spitting of blood is a very frequent, and sometimes a formidable symptom

symptom attending this and some other disorders of the lungs, I would beg leave to add an observation or two relating to it, and remark, that besides occasional bleedings to slacken the vessels, the use of the bark, keeping the *prime viæ* open, and sometimes the necessary dose of a quieting anodyne, I know by long experience there is not a more efficacious remedy for this alarming symptom than half a drachm of nitre, taken two or three times a day in a glass of water; the coolness it produces, and the quiet and tranquillity superinduced by removing the orgazm, and that fretfulness of blood which, in a hectic fever, so generally attends this complaint, being really amazing.

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THERE is also a circumstance or two of very great consequence to be attended to by tender people, who, from a hectic habit and thin vessels, are subject to this alarming complaint; and which, as my own experience has made me particularly attentive to this disorder, I cannot help mentioning and recommending. First then, I would warn the patient against the mischievous tendency of stooping much, as in the act of buckling his shoes, &c. He should never walk, particularly up stairs, quick; nor, in short, exert himself in any action that may have an apparent tendency to increase the power of the heart, or considerably quicken the circulation; but, on the contrary, should regulate all his motions with an equable and uniform tranquillity.

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THERE is likewise a symptom which frequently occurs, and precedes the rupture of a vessel in the lungs, that is worth his particular attention, and which, perhaps, without it, might escape his notice. As those hæmorrhages in a hectic habit have frequently a tendency in some measure critical, so there is of course some little disorder excited in the circulation or an effort in the constitution, preceding them. This discharge therefore, more especially in spittings of blood that are at all periodical, is often foreshewn some time before by a certain confusion and indistinctness of vision, insomuch that objects, when looked at steadily, do not appear sharp and defined. Inebriation is sometimes followed by the same temporary effect, and, perhaps,

perhaps, from the same cause too, which is probably some little stretch of the capillary blood-vessels that accompany the optic nerve in its passage through the foramen to the eye. As soon as this symptom is perceived, which it frequently will be if the attention is always alive to it, especially as we remarked in the case of a periodical hæmoptoe, it will be adviseable to slacken the vessels, and to prevent the rupture of the blood from the lungs, by letting it out at the arm; after which a dose or two of nitre, and some gentle laxative medicines, followed with about an ounce of diacodium in the evening, will be extremely useful.

THERE is another consideration also that is deserving of his notice. Costiveness,

ness, in this disorder, is found to be peculiarly prejudicial ; and indeed it should seem reasonable to suppose that it would be so from the combined operation of two causes, both apparently pernicious. First, from that fulness of the blood-vessels always accompanying this state of the constitution ; and, secondly, from the strain upon them in this distended condition, by the necessary exertion employed in forcing off the fæces when they are in an indurated state.

THE first is certainly a consideration of great practical consequence ; but the second is, in fact, not so formidable a circumstance as one should suppose at first sight : for if this exertion, or any other force of the kind,

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is employed when the lungs are somewhat inflated, or with the precaution of what is commonly called holding the breath, and which, under those circumstances, is ordinarily done, it will in some measure, and during the time it lasts, by lessening the diameter of the pulmonary blood-vessels, produce the effect of a temporary ligature on the ruptured one; for though, when the lungs are ordinarily expanded, the blood passes most freely through the pulmonary artery, yet when the glottis is shut, and under full inspiration, the abdominal muscles, diaphragm, &c. press strongly upon, and consequently condense the imprisoned air in the lungs, as in the act of vomiting or forcing off the fæces, the pulmonary vessels become so considerably

rably streightened by the compressed air in the vesicles, and the circum-ambient pressure on the surface of the lungs without, that less blood passes through them in those circumstances than at any other time. This is the true reason why vomits in a *sputum sanguinis* are always safe, and perhaps may be partly the cause too why they are sometimes an useful remedy.

WHOEVER chuses to be convinced of the truth of the above observation, may be so in its full extent, and to a demonstration, by an experiment always in his power : for when the lungs are expanded to the utmost, if at the height, and as it were the very top of a full inspiration, the glottis is suddenly shut

shut, and the lungs are strongly, and with violence, pressed upon by the respiratory muscles, as little or no blood, under those circumstances, then passes through the pulmonary artery, so little or none is returned through the corresponding vein to the left auricle of the heart, in consequence of which the circulation becomes impeded, indeed almost impossible: accordingly, in a few seconds, the pulse begins to sink, and soon growing weaker, and at length thready, the motion of the heart, if the effort is resolutely persevered in, at last seems to cease; and most probably, were it possible to continue the exertion, would continue to do so. But when, on opening the glottis, and suffering the compressed air to be discharged,

discharged, the pressure is taken off from the vessels, by two or three violent efforts and palpitations of the heart, the circulation re-commences.

THIS pressure upon the vessels of the lungs, by the strong and convulsive action of the muscles of respiration on the air confined in them, is, in all probability, the immediate cause of death in the ordinary execution of hanging. And accordingly Mr. Chesen-den, in his Anatomy, page 176, remarks, that he hath found by certain experiments, that death is brought about, in this melancholy process, no other way than by the interruption of the breath.

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THUS much of the most formidable disease to which that important organ, the lungs, is sometimes subject.

THERE are likewise other accidental causes of mischief to them, which, though not always attended with mortal consequences, are however productive of very troublesome complaints.

IF the lungs are not themselves contaminated with disease, yet, if the chest, from a natural deformity, or by any other defect, is too much strengthened to admit of that free and complete expansion of them which is necessary to perfect respiration, the whole quantity of perspirable matter, assigned by the general œconomy of nature to their share, is not completely breathed off,

off, and by accumulating produces distressing effects.

Or, if the lungs themselves were originally weak and flabby, or are become too much relaxed by accidental weakness or old age, the leakage through the pores of the pulmonary cells, from this preternatural defect, becomes so considerable, that the quantity of transuding lymph, even supposing the fluid inoffensive in itself, and capable of transformation into vapour, can be no longer discharged by the ordinary respiration. Besides, in this weak and flaccid state of the organ, an excrementitious matter of a grosser and pituitous kind, and which was never intended by nature to be ejected

by evaporation, generally pervades the sides of the pulmonary cells, together with the ordinary perspirable matter : this, from the nature of its composition, is absolutely incapable of being completely discharged by the usual process of respiration, and therefore remains in, and choaks up the cells of the lungs, till increasing to a certain degree, and the thinner parts of it being gradually exhaled, the remainder becomes of a sufficient density to be forcibly laid hold of by a strong current of air ; and then the organs of respiration being stimulated into a sudden and convulsive effort, the glottis becomes shut, and the imprisoned condensed air being acted upon strongly by the respiratory muscles, it rushes forward with violence and impetuosity on

on the succeeding openings of the glottis, and, in the course of repeated efforts, carries off the offending matter with it. Thus, in those circumstances, is nature obliged to have recourse to this occasional preternatural exertion ; and in this manner is a cough formed, which is to the lungs what vomiting is to the stomach.

As the ingress of the matter through the weak and flaccid sides of the vesicles is as constant as the cause of it is permanent, those occasional discharges become necessary ; and therefore this complaint is in some productive of an habitual cough ; and in others, when it is to a great degree, of a constitutional and humoral asthma.

THIS complaint seldom terminates in a consumption, or is attended with fatal effects ; and it is not uncommon for patients under this disorder to lengthen out, with great care and caution, a valetudinary life to old age.

THE best adapted palliative remedies to this defective respiration, after the attention that is constantly necessary to avoid occasional mischiefs from taking cold, and a spare diet, seem to be those that encourage external perspiration. Accordingly a dry invigorating air, in which the dissolving principle is active, change of situation from a cold to a warmer climate, gentle exercise on horseback, warm cloathing, and guarding the feet, particularly against

against cold, are exceedingly useful. And, from long experience, I cannot help recommending also what is perhaps equal to them all, as nothing better promotes perspiration, the salutary friction arising from a flannel waistcoat worn next to the skin. As one discharge also generally lessens another, it is found necessary that a costive habit should be avoided by the occasional use of some gentle eccoprotick.

THIS discharge of pituita, and the cough it produces, is not however always the consequence of a fault in the organs of respiration alone, but frequently are from a superabundance of this matter in the habit, owing sometimes to a cold, sluggish, leuco-

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phlegmatic constitution, and a vapid blood ; or, what is more frequently the case in this as well as many other chronic mischiefs, to eating and drinking beyond the digestive powers of the stomach, and consequently more than can be assimilated and converted to the purposes of life ; or, which is the same, than is necessary to supply the demands of nature by recruiting the waste occasioned by exercise or labour ; in short, to too little labour, or too much food. As this error therefore is frequently productive, not only of the mischiefs more directly before us, but is often, I believe indeed generally, the cause of most other chronic disorders, I shall reserve the full consideration of this source of disease to the last chapter, where, as I hope

hope to shew that a luxuriant indulgence of the palate is attended with many mischievous effects to the constitution, so the means of preventing them, as far as that cause is concerned, will of course offer itself to the reader.

## C H A P. III.

THOSE disorders, upon which we have hitherto cursorily remarked, have had their origin from some defect either in the organs of respiration themselves, or in the constitution. The most frequent and familiar disorders, however, to which the lungs are subject, and that with which we are more immediately concerned, arises from without, when both the lungs and the constitution are supposed to be in a sound state ; and that is the very common accidental complaint of a cough from taking cold ; which, though the tender and delicate are most exposed to it, scarcely any body totally escapes.

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THAT the lungs do in fact ordinarily feel the ill effects of an obstruction of external perspiration, is too evident to require proof ; nor can it be reasonably expected to be otherwise : for though, as we remarked before, the part of perspirable matter allotted to them to discharge, in the ordinary œconomy of nature, is considerably more than that which passes off through the whole superficies of the skin, it must, however, necessarily be, that when a larger quantity presses upon them than they were originally calculated to transmit, they will not be able to discharge it in the quiet, stated, and ordinary way.

THE causes of suppressed external perspiration are so numerous, that I shall

shall not attempt a particular specification of them, as such an enumeration would unnecessarily lead to a length I would wish to avoid. However, we may certainly venture to say, in general, that this common disease, to which almost every body is more or less exposed, is entailed upon us by the curse of cloathing; for by the great care we take to keep ourselves covered from the influence of the air, the skin acquires such a sensibility to cold, that even a gentle breeze from Heaven, which in a state of nature would breathe refreshment, now frequently conveys to us the arrows of destruction.

BESIDES that, the anxious care and caution to which the tender and valedinary

tudinary ordinarily habituate themselves, reduce the surface of the body almost to the condition of a sensitive plant. Unhappily too, the very means of warmth and additional cloathing which are employed to get rid of one cold, generally become the cause of, as they lay the foundation for, a subsequent one.

THOSE parts of the body which are constantly exposed to the action of the air, we see scarcely ever suffer inconvenience from it. For this reason an Indian without cloaths at all, a woman in her neck and arms, and any body in the face and hands, seldom get cold; notwithstanding, in those several instances, as the skin must undoubtedly be supposed to have had originally

originally the same perceptive faculty, the subsequent difference must have arisen from different treatment.

IN order to produce the mischievous effects of suppressed perspiration, experience shews it is not necessary that the agency which causes it should be generally applied to, or act upon, the whole surface of the skin. A particular part of the body, which has been usually covered, being by accident, or forgetfulness, exposed; or a pointed stream of air, by striking upon the neck or legs, in a warm room, will produce a cough, or a diseased defluxion upon the lungs. But it must be observed, that this formidable effect cannot certainly be owing to the mere suppression of that inconsiderable quantity

tity of perspirable matter which for excretion fell to the share of the part so particularly exposed, as it can by no means be equal to the severe effects so frequently felt from it in the organs of respiration.

INDEED, the first and ordinary notice we commonly receive of a suppressed perspiration, is a proof that the corrugating action of the cold striking upon a part of the body, is sufficient, by a kind of general consent, to produce its effects over the whole of it : for if, as in the instance just mentioned, the mischief is brought on by a partial stroke of the air upon the legs when a person in a warm room happens to be exposed to a stream of it, the first intimation we receive of the invading

invading mischief, though on the extremities of the body, is by the distant pituitary membrane of the nose, as it frequently in a very few minutes (after the disorder has first been shewn by a sneezing) produces the ordinary symptom of a stuffing of the nostrils. This spasmodic irritation from the dripping pituita, or, if I may so express myself, this cough of the nasal passage, and the thickening of its membrane to so great a degree as frequently to shut it almost entirely, could not, in the former circumstances, have arisen from the actual application of the cold to the membranes of the nose. It therefore can be accounted for only by the general consent of all the parts destined to a particular species of secretion.

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IT is also certain that the cough, or at least the duration of it, so frequently succeeding a general suppression of external perspiration from a more extensive application of cold, does not depend simply upon the additional discharge into the cells and bronchial ramifications, of just so much of the perspirable matter as, supposing no such obstruction, would otherwise have transpired by means of the skin; for, were this the case, the cough would continue no longer than the lungs were oppressed with this additional burthen. But as the cause of this suppression is sudden, so probably it is only temporary, and on a removal of those circumstances which gave rise to it, the perspiratory process goes on in the usual way; at least by warm

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covering and a plentiful sweat, the lungs would soon be relieved from the additional quantity of the perspirable matter with which they are supposed to be oppressed. On the contrary, we find the effect upon the skin, which is productive of the mischief, though so sudden and temporary, shall be followed by a cough, which will sometimes harrass the patient for a month after.

THOUGH every cause, therefore, of a suppressed perspiration, operating upon a particular part of the body, should be attended with an immediate communication of its effects over all the external perspirative powers of the whole skin, we may be well assured, by that soreness of the breast which frequently

frequently attends the convulsive shocks on the first invasion of the cough, that the lungs feel the effects of the additional burthen thrown upon them, not simply by the actual discharge of the *materia perspirabilis* into the cells of the lungs, but principally by its over-charging the secretory organs of the aspera arteria, bronchia, and vesicles, as well as the pituitary membrane of the nose, producing a kind of tumefaction, or thickening of the several parts, which for a time actually shuts up, almost entirely, the passage of the nose, and provokes, by irritation, or an uneasy stimulation in the throat, the perpetual and useless efforts of a petulant cough to discharge from the cavities of the lungs what, in the very early state of the disorder, is not

in fact lodged in them, and which, first of all, serves only to harrass the patient and injure the organ. For in this state of the obstruction, even supposing the stimulus not to arise wholly from the overcharged, tumid, and almost inflammatory state of the membranes, the matter, however, while the remora lasts, which drills from them, is too thin to be laid hold of by a current of air ; which therefore, in the impotent efforts of the cough, uselessly rushes out of the lungs without conveying any thing with it, or producing any kind of expectoration.

THOUGH the consequences of that cause which produces a sudden suppression of external perspiration, are undoubtedly very often productive of the

the cough which we experience from taking cold, I am far from thinking that it always takes its rise from this external agency. The application of cold damp air is most certainly as capable of producing an immediate mischief to the internal surface of the respiratory organs, as to the external surface of the skin ; i. e. we are surely as capable of taking cold on the lungs, as on the surface of the body.

IT is well known that cold contracts animal fibres, insomuch that animals are even reduced to less dimension by it.

EXTREME cold also operates upon the human body as a sort of stimulus, producing a pricking sensation, which is followed afterwards by a glowing

heat, and which, as far as it goes, is a small degree of inflammation in the parts exposed to it.

IF therefore the effects of cold air are so considerable upon the surface of the body, how much more sensibly must its effects be felt by the lungs when it is contrasted by much hotter blood in very thin vessels, and those in immediate contact with the inspired air ? We cannot therefore wonder that cold, by contracting the fibres, and cooling the blood too much in those vessels which are exposed to the air, should suppress some of the grosser parts of the perspirable matter, and consequently, that many salts, which would otherwise in a warm air be gradually evaporated, should then be retained.

retained. From hence, and the obstruction to the free discharge of the mucus from those glands with which the aspera arteria is so thickly disseminated, it is more than probable that the whole pituitary membrane becomes thickened, dry, and in some measure inflamed. That this is the real state of the internal surface of the respiratory organs on the commencement of a cold, while the remora lasts, and before the glands have unloaded themselves by leaking off the obstructed muscus, we may be very sure from the actual pain and soreness which, on the first notice of the disorder, the cough occasions through the whole wind-pipe and breast.

THIS injury very frequently happens when, after having sat some time in a

room where, either by a large fire or a great deal of company, the surface of the lungs has been accustomed to a soft warm air, a person exposes himself, on going out of it, to a cold biting atmosphere, and more particularly so when it is loaded with cold vapour. If, in these circumstances, the precaution is not taken of putting a handkerchief before the mouth and nostrils, that the air, at the same time that it is meliorated or warmed before it enters the lungs, may also be as it were strained from the humid vapour with which it is loaded, the pernicious consequences of the sudden change are generally felt upon the breast.

WE have a demonstrative proof that the lungs may in this manner catch cold,

cold, or that damp cold air is capable of producing those immediate mischiefs in the organs of respiration, from the effects attending the improper use of the Inhaler, which I am about to describe and recommend for the cure of this cough ; for if, out of curiosity, any trial is inadvertently made with cold instead of hot water, the air which enters the lungs, by passing through the water, acquires such a coldness, and is so loaded with vapour, that an experiment of a few minutes will seldom fail to produce a severe cold in the lungs, and a very troublesome cough in consequence of it.

BUT whether this species of injury to the lungs is always the effect of suppressed external perspiration, either partially

partially or generally produced, or, what is much more probable, sometimes owing to the immediate action of a cold damp air on the pituitary membrane that lines the surfaces of the respiratory organs, the cough that is the consequence of either is precisely that to which the remedy I now propose is peculiarly adapted, and for which, in its recent state, it is an expeditious and infallible cure.

THE tickling uneasy sensation which produces those ineffectual efforts, ordinarily comes on within a few hours after the cold is taken ; and this species of cough is distinguished by a soreness quite through the aspera arteria, extending sometimes to the lungs themselves ; but is more particularly

cularly felt at the lower part of the windpipe, about the junction of the clavicles. This symptom is, when the seizure is severe, sometimes very distressing ; insomuch that, in the act of coughing, the internal surface of the organ is so tender, that it seems, as it were, to be harrowed up, and even stripped off by the agitation.

IN what manner this remedy produces its salutary and sudden effects, I shall not attempt to investigate. My design is, principally, practical information. Yet I cannot help just observing, that if relaxing and easing the parts which are overcharged, and consequently a resolution of the obstructions formed in them, is likely to remove the inflamed and thickened state

state of the pituitary membrane, and the consequent irritation produced from this diseased state of it, no process seems better calculated for the purpose.

INDEED, it was from a conviction that the Catarrhous Cough arose from some degree of actual inflammation in the pituitary lining of the organs of respiration, that the idea of this species of cure was first suggested ; for if the disorder of the membrane is only the effects of a cause which is topical, sudden, and temporary, it becomes reasonable to suppose that a well-adapted local remedy would be productive of the same good consequences in this as in any other species of inflammations. In this view, the two great

great indications would be, to prevent as much as possible the irritation arising from the convulsive shocks of the cough on the inflamed parts, and to remove the inflammation itself by such emollient applications as could conveniently be administered to them.

THOSE intentions are thoroughly answered by opium, and by inhaling warm steams into the lungs ; for by the first, the internal surface of the aspera arteria and bronchiæ are, during the effect of the medicine, rendered in a great measure insensible to the mischievous irritation, to which they would otherwise be subject ; and the application of the warm vapour, under the protection of the opiate, by acting like a fœtus, and in opposition to the

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very cause by which the disorder was produced, resolves the inflammation, by unloading the turgid capillaries of the pituitary membrane.

WHETHER this reasoning be admitted or not, the fact is past dispute, that the conjoined powers of those agencies are a sure, and, in general, an immediate cure. But in order to experience the certain advantages of this remedy, it is not only necessary that the species of cough for which it is peculiarly calculated should be exactly ascertained, but it is also to be remarked, as essential to the sure and speedy effect of it, that the remedy should be applied as soon as possible after the invasion of the disorder. If, for instance, the cold is caught in any part of

of one day, the process should not be delayed longer than the evening of the same day, or at most that of the succeeding one; for though its effects are not so much confined as to be useless at a greater distance of time, yet when the mischief the lungs have received has been confirmed by time, and the inflammatory tendency is possibly increased and aggravated by the determination of any floating acrimony in the habit to the injured parts, which, under those circumstances, is generally the case, the cure will not be so sudden; but it will be then sometimes necessary to repeat both opiate and inhaler the succeeding morning, when the effects of the former dose are exhausted, which is usually about eight or ten hours after. In this case, the greatest

greatest part of the same day should be spent in bed ; and the patient may be assured that his perseverance will be rewarded with ease and comfort the succeeding night, and subsequently, if the remedy has not been too long delayed, with almost a certain cure of his disorder. So likewise, if the first attack is uncommonly severe, and the injury the wind-pipe and lungs have received is very considerable and distressing, more especially if the remedy has been delayed till the second night after the seizure, a repetition of the medicine will be sometimes equally necessary, and be usually attended with the same success.

BUT when the Inhaler is used in the very recent and ordinary state of the cough,

cough, viz. the evening of the attack, the patient is sure of being surprised with an immediate cure; so sudden indeed, that it is more than probable he will cough no more, except once or twice perhaps the succeeding morning, to discharge what is drilled into the branches of the bronchiæ, and which, as the thinner parts have during the night evaporated, is easily, and with a very gentle effort, spit off in a concocted state.

INDEED the effect of this remedy is so very sudden and certain, when used the same day the cold is contracted, that it was with difficulty, and not till after several trials, that I could myself credit the reality of the cure. As I have all my life, from

tender lungs, had a propensity, on taking cold, to a cough of this sort, (which, in the ordinary course of it, used to harrass me for three weeks or a month, and sometimes much longer) I was myself the first subject of the experiment. The night the remedy was first used was passed without the least tendency to cough ; and the next morning, by one or two very gentle efforts, a small quantity of concocted matter was discharged, without the least disposition to cough afterwards ; notwithstanding which, I could not be persuaded the whole succeeding day that the cough was radically cured, and accordingly, was in constant expectation of its return. However, it did not return, nor has it ever done so in a single instance out of the great numbers

numbers that have been cured by this remedy, where the application was made in the recent and ordinary state of the disorder.

AFTER trying the effects of various pectoral ingredients, I found the vapour of none of them so inoffensive and grateful to the lungs as that from simple warm water. This part of the cure therefore seems to be nothing but the consequence of soft and sudden relaxation from mere warmth and moisture.

BEFORE I enter upon the directions for the cure of this species of cough, it will be necessary to give a general description of the Inhaler; a more particular account of which, accom-

panied with a drawing for the instruction of the workman, is added at the end of this chapter.

THE body of the instrument holds about a pint; and the handle, which is fixed to the side of it, is hollow. There is in the lower part of the vessel, where it is soldered to the handle, a hole, by means of which, and three others on the upper part of the handle, the water, when it is poured into the Inhaler, will rise to the same level in both. To the middle of the cover a flexible tube, about five or six inches long, is fixed, with a mouth-piece of wood or ivory. Underneath the cover there is a valve fixed, which opens and shuts the communication between the upper and internal part of the Inhaler and

and the external air, for a purpose which shall be presently explained.

WHEN the mouth is applied to the end of the tube in the act of inspiration, the air rushes into the handle, and up through the body of warm water, and the lungs become, consequently, filled with hot vapour. In expiration, the mouth being still fixed to the tube, the breath, together with the steam on the surface of the water in the Inhaler, is forced up through the valve in the cover. In this manner therefore the whole act of respiration is performed through the Inhaler, without the necessity, in the act of expiration, of either breathing through the nose, or removing the pipe from the mouth. The use of this construc-

## A RADICAL CURE FOR tion of the instrument will be shewn hereafter.

HAVING premised thus much, we shall proceed to the use of this apparatus, after once more repeating the caution of not trying the experiment on the Inhaler with cold water, as it will certainly produce the complaint for which it is here proposed as a remedy.

IN the evening, a little before bed-time, the patient, if of adult age, is to take three drachms, or as many tea spoonfuls of Elixir Paregoricum, in a glass of water : if the subject is younger, for instance under five years old, one tea spoonful ; or within that and ten years, two. [Each tea spoonful contains

contains somewhat less than i quarter of a grain of opium.] About three quarters of an hour after, the patient should go to bed, and being covered warm, the Inhaler three parts filled with water nearly boiling, (which from the coldness of the metal, and the time it ordinarily takes before it is used by the patient, will be of a proper degree of warmth) and being wrapped up in a napkin, but so that the valve in the cover is not obstructed by it, is to be placed at the arm-pit, and the bed-cloaths being drawn up and over it close to the throat, the tube is to be applied to the mouth, and the patient should inspire and expire through it about twenty minutes, or half an hour.

IT is very evident, as the whole act  
of respiration is performed through  
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the machine, that in inspiration the lungs will be filled with air which will be hot, and loaded with vapour, by passing through the body of water ; and in expiration, all that was contained in the lungs will, by mixing with the steam on the surface of the water, be forced through the valve in the cover, and settle on the surface of the body under the bed-cloaths.

THE great use of this particular construction of the Inhaler is this. First, as there is no necessity, at the end of every inspiration, to remove the tube from the mouth, in order to expire from the lungs the vapour which had been received into them, this machine may therefore be used with as much ease by children as elder people.

And,

And, secondly, as a feverish habit frequently accompanies the disorder, the valve in that respect also is of the utmost importance; for a sweat, or at least a free perspiration, not only relieves the patient from the restless anxiety of a hot, dry, and sometimes parched skin, but is also, of all others, the most eligible evacuation for removing the fever; and it will be generally found that, after the Inhaler so constructed hath been used a few minutes, the warm vapour under the cloaths will, by settling upon the trunk, produce a sweat, which will gradually extend itself to the legs and feet.

IN a catarrhous fever, or any feverish habit attending this cough, it would

would be proper to take a draught of warm thin whey a few minutes before the Inhaler is used ; and after the process is over, the sweat which it has produced may be continued by occasional small draughts of weak warm whey, or barley water. The sweating is by no means so necessary to the cure of the Catarrhous Cough, as that the success of the Inhaler against that complaint at all depends upon it ; yet I cannot help once more remarking, that when this disorder happens to be accompanied with a feverish habit, the advantages of this particular construction will be very important.

AFTER this respiratory process is over, the patient usually passes the night without the least interruption from

from the cough, and feels no farther molestation from it than, as I observed before, once or twice in the morning to throw off the trifling leakage which, unperceived, had dripped into the bronchiæ and vesicles during the night; the thinner parts of which being evaporated, what remains is soon got rid of with a very gentle effort.

I CANNOT, however, take leave of this part of my subject, without pointedly observing, that if the patient means not to be disappointed by my assurances or his own expectations, it is essentially necessary that the preceding remarks, with regard to the time and manner of using this process, should be strictly attended to. I will beg therefore once more to repeat,

FIRST,

FIRST, That as tender valetudinary people are but too well acquainted with the first notices of the disorder, the remedy must, or ought to be, used the same evening, which will, in an ordinary seizure, be attended with an immediate cure ; but if the soreness of the respiratory organs, or the petulance of the cough, shew the cold which has been contracted to have been very severe, the Inhaler, without the opiate, should be again repeated for the same time the next morning.

SECONDLY, If the use of the Inhaler, &c. is delayed till the second night, it will be always right to repeat it again the next morning without the opiate, but with it if the seizure has been violent.

AND,

AND, lastly, If the cough is of some days standing, it will be always necessary to employ both parts of the process at night and the succeeding morning, as the first simple inflammatory mischief is now most probably aggravated by an additional one of a chronic tendency.

I SHALL conclude this chapter with observing, that if through the want of a timely application, or a total neglect of this or any other remedy, the cough should continue to harrass the patient, it is, particularly in delicate and tender constitutions, of the utmost consequence to attempt the removal of it as soon as possible, before any floating acrimony in the constitution (from the perpetual irritation) receives an habitual

tual determination to an organ so essential to life as the lungs.

IF the patient expectorates with ease and freedom a thick and well-digested inoffensive phlegm, there is generally but little doubt of his spitting off the disorder, with common care, in a few days; and till that is accomplished, a proper dose of elixir paregoricum for a few successive nights will be found very useful in suppressing the fatiguing irritation and ineffectual cough, occasioned by a matter which, dripping in the early state of the disease into the bronchiæ during the night, is commonly at that time too thin to be discharged by those convulsive efforts.

IF, however, notwithstanding a free and copious expectoration, the cough should

should still continue, and the discharge, instead of removing the complaint, should itself, by becoming a disease, be a greater expence than the constitution can well support, it is possible that a tender patient may spit off his life through a weak, relaxed pair of lungs, without the least appearance of purulence, or any suspicion of suppuration. In those circumstances, besides, as was mentioned before, increasing the general perspiration by the salutary friction of a flannel waistcoat, change of situation, and more especially long journies on horseback, conducted as much as possible through a thin, sharp, dry air, will seldom fail of removing the complaint.

BUT, on the contrary, if the cough should, at the same time that it is pertulant

tulant and fatiguing to the breast, continue dry, husky, and without expectoration ; provided there is reason to hope that no tubercles are forming, or yet actually formed, there is not perhaps a more efficacious remedy for it than half a drachm of gum ammoniacum, with eighteen or twenty drops of laudanum made into pills, and taken at bed-time, and occasionally repeated. This excellent remedy Sir John Pringle did me the honour to communicate to me, and I have accordingly found it, in a great many instances, amazingly successful, and generally very expeditiously so, for it seldom fails to produce an expectoration, and to abate the distressing fatigue of the cough. In those circumstances I have likewise found the common remedy of 3s or 9ij of Balf. Sulph. Anisat. taken twice

twice a day, in a little powdered sugar, or any other vehicle, a very efficacious one. I have also, many times, known a salutary revulsion made from the lungs by the simple application of a large plaster, about five or six inches diameter, of Pix Burgund. between the shoulders ; for the perspirable matter, which is locked up under it, becomes so sharp and acrid, that in a few days it seldom fails to produce a very considerable itching, some little tendency to inflammation, and, very frequently, a great number of boils. This application should be continued (the plaster being occasionally changed) for three weeks, or a month, or longer, if the complaint is not so soon removed.

AND here I cannot help observing, that though seemingly a trifling, it is, however, by no means a useless caution to the tender patient, not to expose his shoulders in bed, and during the night to the cold ; but when he lies down to take care they are kept warm by drawing the bed-cloaths up close to his back and neck.

IF, however, notwithstanding these and other means, the cough, continuing dry or unattended with a proper expectoration, should persevere in harassing the patient ; if, at last, it should produce, together with a soreness, shooting pains through the breast and between the shoulders, attended also with shortness of the breath ; and, if added to this, flushes of the cheeks

after

after meals, scalding in the hands and feet, and other symptoms of a hectic, should accompany the disorder, there is certainly no time to be lost, as there is the greatest reason to apprehend that some acrimony in the habit is determined to the tender substance of the lungs ; and that, consequently, tubercular suppurations will follow. In this critical and dangerous situation, I think I can venture to say from long experience, that, accompanied with change of air and occasional bleedings, the patient will find his greatest security in a drain from a large scapulary issue, assisted by a diet of asses milk and vegetables \*.

\* Vide page 63.

## C H A P. IV.

*On the Vis Vitæ, so far as it is concerned in preserving or re-instanting the Health of an Animal.*

IN the most perfect piece of mechanism that was ever contrived by man, the utmost expectation of the mechanic has always been confined to the hopes that, by the agency of some mode of power, his machine might continue to answer the purpose of its intention, 'till disabled by a gradual wear of the materials with which it was constructed, a period should be at last put to the effects of his skill.

WE never find in the best designed, and most complicated result of human workmanship, even an attempt to impart to it any principle, or provision, for supplying in the constituent parts the consequences of that waste and wear, which must be the necessary effect of continued motion.

BESIDES this principle of imperfection, every production of art is equally unprovided also with the means of repairing any injury it may suffer, either from external violence, or the internal accidents to which it is always subject, from the unavoidable imperfection of materials ; and either of those events is capable of defeating the design and labour of the inventor ; for, if once its motion is destroyed,

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though by the most trifling defect, the consequence becomes as permanent as the cause, and the machine is rendered useless.

IT is the union of those important resources of *supply* and *renovation*, possessed by animal nature, which constitutes that effort as it were towards immortality, so peculiarly characterizing the works of the Creator. In this respect, exclusive of an infinity of others, the most contemptible reptile is infinitely superior to the most perfect and elaborate performance of man.

THE operation of this renovating agency is, indeed, so apparent and efficacious in animal life, that physicians have been led to consider, or at least

to

to talk of it, as a principle almost possessing cogitation ; and, as it were, a genius presiding over the health and well-being of the animal. Thus, under the name of Nature, it is said to be the curer of diseases.—That Nature relieved the constitution from the offensive matter, by this or that critical discharge, as the best adapted to the purpose.—Hence also the several expressions, that Nature is kind, or acts wisely.—Nature must not be opposed ; but at most be gently checked ; or, if in a languid state, assisted. These expressions, I say, which are the result of experience and long observation, are certain proofs that animal life is possessed of a very active principle, which efficaciously exerts itself towards its preservation.

AND, indeed, if we take a view of the creation at large, we shall find that this principle of self-preservation, or that effort towards a perpetuity of existence, is not confined to animal, or even to vegetable life : we shall perceive it extending itself into a universal law ; equally impressed upon, and pervading, every individual of the creation ; and operating in each in a mode adapted to the nature of its existence. Thus, if we descend to the very lowest order of material existence, it will be found, that even the mean and common materials of which our earth is composed, abhor annihilation : these, under the simple agency of necessity, maintain their form and being by a strong cohesive attraction, and a super-added principle of gravitation, impres-  
sed

fed upon them towards the common centre ; insomuch that, by the universality of this active bond of union, the being of the whole depending upon and being supported by the same power which is equally possessed by the smallest and most contemptible atom, the earth is preserved intire ; so that not a particle is lost to it, from the creation to the present hour.

IF from the lowest we ascend to the next order of existence, we find the parts of which the individuals of it are composed, involve not only the *inferior* and *ordinary* powers of union, by a gravitation in common with the earth, but possess also the superadded privileges of a specific or elective attraction to those of their own kind ; such are those

those of the metallic sort, and the whole tribe of fossils, &c. These, therefore, are endowed with a nature superior to the former; but, as their active principles of existence and self-preservation are simple and determined, and therefore well understood, these also are said to be influenced and preserved by the agency of necessity.

IF we proceed on to the order of vegetables, the causes of their specific existence, accretion, and growth, are more complicated, and, of course, less comprehensible. For this species of existence not only involves in its nature the powers of the two former, viz. the ordinary gravitating principle of gross matter, and that elective attraction possessed by the metallic kind, but it is necessary

cessary also that the plant should, by a well-adapted organization of its various parts, be possessed of such powers of communication with its parent earth, as may qualify it for the appropriation or admission of such substances, and such only, as are suited to its more complicated nature. However, though the causes of its growth and preservation are, by being further removed from our comprehension, sublimated into the general idea of life, yet we do not, even here, lose sight of necessary agency in the several parts which compose the plant; and as a large train of necessary causes and effects, concerned in its growth, are exposed to our cognizance, we take it for granted that those which are hidden from us are of the same nature.

BUT,

BUT, if we extend our view still higher into the animal part of the creation, we there find, superadded to all the former properties of the plant, and to an organization infinitely superior, locomotive powers, and an internal principle for the direction and employment of them. As the subject, therefore, and the whole complication of causes and effects, are infinitely beyond our comprehension, the idea of necessity now ceases, and that of liberty, depending upon volition, begins : and as the nature of existence is become more mysterious, so the means of perpetuating it are more extensive ; for, as a greater variety of combined causes are concerned in the support and formation of an animal, so the resources for its preservation, and the means of its

its destruction, are proportionally multiplied.

HENCE as, with respect to vegetable life, the earth is the great basis which contains, and from which are extracted, all the various principles which are necessary to the infinite variety of plants, as well as the particular parts of each individual : as the earth must possess what, by the specific organization of plants, is convertible into their several peculiar properties, from the juice of the deadly nightshade, up to that of the delicious anana ; so the blood, the great pabulum of all animal secretion, must be so compounded as to involve all those principles which, by the configuration of the secretory organs, are convertible

tible into the various fluids which are necessary to animal life. It is therefore necessary that this fluid should not only be supported, and occasionally recruited, by such materials as are adapted to this important end ; but that it should be preserved, likewise, from foreign contamination : and as the plant is actually so formed, by the configuration of the parts destined to nutrition, as to receive, and at the same time exclude what is, respectively, proper for its support, or destructive to its nature ; so the animal must be possessed of powers and perceptions, for choosing the one and avoiding the other.

SUCH powers of discernment and means of communication with those several

several parts of external nature, as are necessary to this purpose, we find every animal actually possessed of ; and the operation of this commerce, through the agency of the senses, we call by the general name of instinct.

As these instinctive powers are essential to, and fully sufficient for, the preservation of animal life, in the brute creation, so we find them existing, in full force, in the higher scale of rational beings. Without engaging, therefore, in metaphysical disquisitions, as to the proper offices of the *animus*, and *anima*, in the œconomy of life, we shall trust to the more certain deductions from analogy, and conclude, that though man has, moreover, the super-added privilege of reason or cogitation,

tion, yet, as we have observed that the powers and principles of the inferior are always involved and possessed by the several successive orders of superior existence; and, as we know that the purposes of mere animal life are fully and effectually provided for in brutes, by instinct without reason, so the human subject also possesses, is indebted to, and principally preserved by, its notices and protection.

ACCORDINGLY, it is very happily ordered by Providence, that in the human species, the instinctive notices to any action are always proportioned to the importance of it; and for this reason, such particularly as are necessary to our very existence, are enforced upon us, not only by strong incentives, but generally

generally by proportional immediate rewards in the actual performances of them.

THIS is no less true in the preservation of our being, than it is in the production of our species : to this we are propelled by motives almost irresistible, and to that by the hidden enchantments of hunger and thirst ; and in both alike are bribed to a discharge of them by a pleasure in the execution ; without which incentives there is the greatest reason to suppose a period would soon be put to our existence. For if mankind, by substituting cogitation for instinct, were to take in food from principles of reason and philosophy only, and with no other motive but that of supplying the waste expended

expended for the purposes of life, great part of them, probably, from inattention or indolence, would starve to save themselves the trouble of eating. Providence, therefore, has not trusted those important concerns either to capricious motives, or the fallible direction of our reason.

BESIDES, philosophy, or the most profound investigations, could never discover to us when, or in what quantity, those supplies were necessary, or whereof they ought to consist : these mysterious notices must depend upon a more comprehensive knowledge than we are possessed of.

AND accordingly, Providence has imparted to us the results of its own wisdom

dom in the instinctive informations of *hunger* and *thirst*; and, consequently, upon those notices we do in fact depend for the support of life; for, it is very certain, that in a sound and uninitiated state of nature, when we are instinctively incited to eat, the body then needs a supply; that when the craving ceases, the quantity taken in is sufficient; and also that the digestive powers of the stomach are ordinarily proportioned to the quantity which has been conveyed into it.

So far, therefore, as to the mere *quantity* of food; the *time* when, and how often a fresh supply of it becomes necessary to the recruit of the worn and wasted fibres, or for the other purposes of animal life, the simple instinct

of hunger may, indeed *must*, be depended upon as sufficiently informing us.

BUT, of what kind or nature the materials ought to be, or what peculiar properties they should possess, to qualify them for imparting to the blood such principles as are adapted to a coalescence with, and to the support of, a machine so infinitely complicated and various, and without which qualities they could not be proper for the purposes of recruiting the decay of the several parts of the body, the deepest researches of the human mind never could discover to us. We are intirely at a loss, in a way of reason, not only to make choice, out of the infinity of substances before us, of those things which

which contain such properties as are calculated for the supply of the wants and purposes of nature ; but the human mind is so totally blind to distinctions of this sort, that it is not capable even of making a proper discrimination of them, from those substances that would be pernicious, or even to discern food from poison.

THIS intelligence, or necessary power of discernment, the Author of our being has likewise endowed us with, by the perceptions of the *eye*, the sense of the *smell*, and the scrutiny of the *palate*: and these sublimated modifications of *feeling*, nicely adapted to the internal state of the body, establish the commerce, and become the connecting media, between the animal and exter-

nal nature. Whenever therefore the appetite gives the necessary notice for a supply, the first test the substance we propose for food undergoes, is that of the eye ; and if it incurs its disapprobation by looking disagreeably, even this in general becomes a reason for discarding it. But if, on the contrary, its appearance is pleasing, and satisfies the sense of seeing, it is submitted to the succeeding test of the smell, which often discovers a latent mischief concealed from the former ; and then its information is generally, and no doubt with great reason, attended to. But if it escapes this scrutiny also, we offer it to the further examination of the taste ; and if that gives a sanction to our choice, the materials are then conveyed into the stomach

stomach and guts ; both which, however, as a further guard against mischief, are evidently endowed with a perception of their own ; insomuch, that if what was made use of for, and conveyed into the stomach as food, does, notwithstanding all the former tests, still possess a lurking property, which would be injurious to the constitution, the stomach is stimulated into a rejection of it by the act of vomiting, or the guts by that of a diarrhoea.

THESE internal perceptions and consequent exertions, therefore, are truly the first and simplest acts of what is called Nature ; so that disease is seen here in its simple and least complicated form.

BUT if, notwithstanding all those out-guards to the body, there should still be a subtle concealed principle remaining, which passing into the constitution, would be offensive to the fountains of life, even then animal existence is not left in a defenceless state ; for when the blood is contaminated with something to which, in a sound state, the retaining vessels were not originally accustomed, the heart, and the various vascular parts of the body subject to the influence of the evil, (in analogy to the palate, stomach and guts, and from the same principle of animation) will, by a perception acquired under a natural quiescent habitude to good blood, be stimulated into preternatural exertions not unlike the vomitings of the stomach, and which,

which, in the form of a fever, frequently forces or purges off the offending matter through some of the excretory ducts. For this reason, in the instance of inebriation or debauch, before the constitution is accustomed or habituated to it, every irregularity of that sort is attended with a temporary fever, which, after a restless night, is ordinarily terminated by a critical sweat in the morning.

THIS resistance and effort, however, against evil, so far as the principle of habitude is concerned in that resistance, will successively lessen in proportion to the repetition of these violences offered to the constitution ; for that very habitude, which was in a great measure at first the cause of the quiet

quiet and tranquillity, or of that ease and want of all feeling which constitute health, and which the several vascular parts of the body enjoyed in a sound and perfect state of the juices, will at last subvert the intentions of nature, by reconciling them to those fluids when in a diseased condition.

So long, therefore, as the discerning faculty of the palate continues pure and unvitiated, and the perceptive powers of the stomach, guts, and more remote recesses of the vascular system, are quick and active; so long the constitution will preserve itself from external contamination by their notices, or, what is the same, by occasional efforts and exertions of their several powers, or, by what are called so many

many necessary morbid processes. But when, from a long course of perpetual intemperance, the order of things is unhappily inverted, and all those principles of security and defence do, by a habitude to evil, become insensible and reconciled to it, the debauchee will perhaps exult in the persuasion that his constitution is at last become superior to all the burthens he lays upon it, because debauch ceases to produce disease. But it is in fact a deadly inactivity; the discerning powers of animal good and evil are lost; and from this time a bad habit commencing, a scratch may prove mortal, from the destruction of the renovating powers of the constitution. In short, the blood becomes poisoned, and of course all the juices of the body which are secreted from it.

To return. How it comes to pass that these out-guards of the body, viz. the eye, the nose, and the palate, should have this intelligence with the internal state of the constitution; or by what invisible ligaments the connexion is produced, so that whatever is pleasing and agreeable to the former should be perfectly adapted to the several wants of the latter, is perhaps to us inexplicable; but we may be assured that they are ordinarily suited to each other, insomuch, that whatever excites pleasure in these senses, as long as they remain in a perfect and undraped state, is proper also for the purposes of the animal œconomy. Indeed this great principle of security and preservation, so essentially necessary to the animal, is at the same time so perfect

perfect and active, that the sight and smell are stimulated by the mischief into a perception, or as it were a feeling of it, before it even enters the body; and not unfrequently the stomach also uniting with the senses, by a sympathetic abhorrence of the evil, discovers its disgust by vomiting, even before it is invaded by it.

INSTANCES of this sort are not unfrequently seen in the effects produced not only by the smell and taste, but even by the eye. Every cathartic is undoubtedly, as far as it goes, a poison, and must be supposed, in a sound and perfect state of the constitution, to be pernicious. But when an animal is diseased, it is sometimes necessary to attempt the destruction of a greater evil

evil by the operation of a less. However, when the bowels have actually experienced the pernicious and poisonous tendency of the medicine administered for this purpose, the senses will so far enter into the confederacy against its future attacks, that, in some tender and very delicate subjects, it will subsequently purge through the medium of the eye: and accordingly there have been instances where a dose of physic on the chimney-piece has operated as effectually upon the body, by this species of intelligence, as if it had been actually lodged in the bowels.

THESE out-guards of the body are indeed so exquisitely adapted to the great purpose of animal existence, that there is scarcely an instance in nature,  
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where a vegetable poison does not, either by an ill look, stinking smell, or bad taste, give sufficient notice, by some or other of the senses, of its mischievous tendency. This, indeed, is not always the case with chemical ones; these being the production of art, nature has not so effectually guarded against them.

THE real correspondence subsisting between the senses and the internal state of the animal œconomy is proved likewise by the different manner in which those senses are affected in different persons; and, also, in the same person, in different circumstances of the constitution.

SOME general substances indeed there are, which the senses of all mankind agree

agree in approving, and these are accordingly pronounced, by experience, to be proper materials for recruiting the body; and, because they are generally agreeable, may be therefore proper for the same person in every state of the constitution; but there are other productions, which, though very pleasing to the palate of some, and therefore very proper for the corresponding constitution, are nevertheless very disagreeable and nauseous, and for that reason detrimental to others. This is true to such a degree, that when any particular food, which, though exceedingly pleasing to one person, has been, by cheating the test of the palate, imprudently, and without his knowledge, conveyed into the stomach of another, to whom

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it was disgusting, the stomach has either discovered the imposition, and rejected it, or it has sometimes been attended with worse consequences ; and, according to the old adage, one man's meat has proved another's poison.

THIS is not only true in different subjects, but also in the same person in different circumstances. We not only admire in youth what is less agreeable in more advanced age, but in the intermediate part of our lives, we at different times like and dislike the same things ; and their effects upon the stomach and constitution ordinarily keep pace with those notices. The correspondence of the palate, &c. to the various alterations which happen in the same constitu-

tion, is in no instance shewn more strongly than in instinctive pointings, when the alterations in the body are so great as to become a disease. This principle leads the dog to his medicine, grafts, and the several species of animals to their various *nostra*; and in the human race, is frequently seen also by those eager longings for particular things which, in other circumstances, were not agreeable; and the salutary effects of an indulgence in them, have been seen in a thousand instances. For though every whimsical or capricious inclination of a sick patient is not to be attended to, yet, when the desire of any particular food is violent and lasting, it may be depended upon that so strong a pointing of nature generally has its foundation in truth.

FROM these considerations, therefore, we may conclude, that as without those instinctive informations of the appetite and senses, we should not know, even at all, when to eat, how much to eat, or what to eat; so we may be very sure that the varieties we find in them, in different persons, are in the general nicely adapted to the peculiarities in the constitution of each individual.

THE impropriety, therefore, of pressing a regimen upon another, though disagreeable to him, because it suits our own palate, stomach, and constitution, is very apparent; for though there are some things, as was before observed, in the approbation of which all agree, and which are there-

fore set down in the list of those which are easy of digestion, there are however others, and of this some of the shell-fish tribe afford a remarkable instance, which, though grateful to the stomach and agreeable to the constitution of some, will be yet evidently poisonous to others. For this reason, therefore, to impose obstinately our own feelings and experience in direct opposition to the experience and feelings of another, is very absurd.

EXACT, however, as those external indications are, and in general equal to the purpose of securing the body from any thing that would be pernicious to it, it must, notwithstanding, be acknowledged that, in common with every other part of the animal, they are

are not, as hinted before, so very perfect, but that they are sometimes subject to deception, and the detection of that imperfection is commonly discovered by the perception of the stomach, and is frequently experienced under the well-known disorder of a surfeit.

HITHERTO we have considered those external perceptive faculties as tests of examination only, and that as we have in fact no other means of information with respect to the great profusion of materials before us, which of them are proper for the purpose of animal preservation; so they are nicely adapted to the constitution of each individual, and likewise to the differences of constitution which may happen in the same body.

THIS, though an important use of the senses under consideration, is, however, by no means the only benefit the animal receives from them in the great business of nutrition ; for we are not only informed by their notice of those materials which are proper for repairing the decays of the body, but are also stimulated into the choice of them by the pleasure which those senses affords us in the use of them ; insomuch that the indispensable supply, which without this gratification would be a disagreeable and laborious task, is by their means rendered pleasing, and not the least of our enjoyments.

BUT as in the moral world it is a gross mistake to suppose that the whole reward of a virtuous action consists in  
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the conscious pleasure arising from the performance of it, so we must remember that the whole use of a hearty meal does not reside in the pleasure we receive in eating it. They are both alike necessary and useful pleasures, by which we are, as it were, bribed to a duty, the great end of which is, in one instance, necessary to the order and happiness of the moral world, since the action it produces is constantly operating in it; and in the other, to the very being of the animal, because the food it takes being ennobled by animation, repairs its defects, and preserves its life.

THIS pleasure or gratification, however, which was given us for perpetuating our being, is unhappily but too

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frequently the cause of its disease, and sometimes indeed of its destruction ; and this because we do not properly distinguish, or carefully attend to, the difference between the enjoyments of palate, and the pure and simple cravings of hunger. It must be remembered, that the petulant and clamorous demands of hunger and thirst are the first, and indeed only, incitements to a necessary supply for the purposes of life ; and also, that with this important intelligence the external senses have no manner of concern ; therefore, as we can receive no information but from those appetites when a supply is wanted at all, so we have remarked that the degrees of them are proportioned to the wants of the constitution ; for when there is a great consumption of strength

strength or flesh, by hard labour or violent exercise, the income must of course be proportioned to the expence. So long therefore as we act simply under the motive of hunger, we shall not err as to the frequency of the supply, or the necessary quantity of it. But if, on the contrary, we mistake the means for the end, and become enslaved to the palate by cultivating the delights of it; in short, if instead of enjoying the pleasures of this motive to our duty within the bounds intended by nature, we unhappily subject ourselves to the dominion of it, and so far as intirely to lose sight of its original intention, we shall in this instance, as well as in many others, convert a blessing into a curse; since that necessary incitement, which was designed

signed by nature for the support of life, will, by sowing the seeds of death, become its destruction.

WE must remember, therefore, that the power of the constitution to convert food into nourishment depends upon and keeps pace with the simple informations of hunger only; or, in other words, that the digestion is in general proportioned to the appetite; insomuch, that where there is a total want of hunger, there is also ordinarily an intire suspension of the digestive powers. This truth is exemplified in its utmost extent when an animal is out of order, and the constitution so much injured, that a disease becomes necessary to its repair; for here nature always commences the process by totally

tally destroying the appetite, that no further confusion or mischief may be added to the already oppressed œconomy. Accordingly, if, in those circumstance of the constitution, the patient is prevailed upon to eat, not only perhaps without appetite, but even in spight of nausea, the stomach generally secures the constitution from the intruding mischief by rejecting what has been forced into it. As soon, however, as by the diseased process the evil is swept from the habit, and the digestive powers of the stomach, in common with the general œconomy of nature, are reinstated, the first notices of it are always shewn by the tender calls of appetite, which soon increasing beyond the usual standard, repairs the waste and expence occasioned by the disorder.

IF therefore we take in food from motives of pretended reason, without the notices of hunger ; or, which is the same, are tempted to continue to do so by the incitements of the palate, after that hunger ceases ; such an indigestion, by exceeding the expence and reals demands of nature, will become a source of disease, and we shall certainly convey more into the stomach than can be converted to the purposes of life ; and the necessary consequence attending an habitual practice of this sort will be, that if the principles of life are vigorous and active, they will, by the accumulated mischief, be sometimes stimulated into violent occasional efforts, or, which is the same thing, into an acute disease, to discharge the evil from the constitution ; or otherwise,

wife, if the powers of animal preservation are languid through original weakness, or, from habitude to it, have lost their perceptions of evil, chronic mischief will follow, as well as a host of anomalous hypochondriac complaints, which are truly no other than the language of an oppressed constitution.

INDEED, if one takes a view but for a moment of the form and make of the human body, one cannot but perceive that the locomotive powers of which it is possessed, and which were certainly made for employment, make up a great part of the machine. How large a proportion, for instance, does the apparatus for the motion of the lower limbs, the legs and thighs, bear

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to the other parts of the animal ! and if to these we add also the other muscular powers of the body, which are all calculated for exertion, how small a part of the whole remains ! Now, since Nature never puts herself to useless expence, if all those agencies are not employed, the organs for their support becoming for that reason unnecessary, gradually decay. From this principle the muscles in general, through indolence and laziness, or the legs in particular of a gouty man, from incapacity for motion, become flaccid, grow weak, and waste ; and, on the contrary, those of the laborious, as the limbs of a porter, grow firm, strong, and large. If such a supply, therefore, as would be sufficient for the support and employment of all those

those powers, is taken into the constitution without being applied to the purposes of them, it is impossible but the consequent accumulation must be productive of disease.

AND here I cannot help remarking, that I have lived long enough to be convinced, by repeated observation, that from the above considerations it is that the grand climacteric, or at least its vicinity, becomes a period of that importance to the life of man: for about this age, indolence and indisposition to motion from the natural impotence of increasing years, generally gain ground, and frequently render eating and drinking the great business of life. If, therefore, in those circumstances, a man has not firmness  
enough

enough to withstand the enjoyments of the palate, or resolution sufficient to counteract the effects of them by a degree of exercise or labour proportioned to his strength, the pernicious tendency of this indulgence unites itself to the baneful consequences of a lazy inactivity. The body, therefore, instead of wearing equably with the gradual approaches of old age, as it usually would do in a state of temperance, becomes bloated with an accumulating pituitous, indigestible trash, which nature is totally unable to animalize, or convert to the purposes of life : the excretory system, from this cause and want of motion, being necessarily choaked, is at last totally obstructed ; and then the constitution breaking up, the solids rot in their juices.

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SINCE therefore a sound and uncontaminated state of the constitution must necessarily depend upon a supply proportioned to those demands of nature which are ordinarily signified to us by the instinctive notices of hunger and thirst ; if, notwithstanding, by the temptations of sense, we are determined to exceed this salutary measure, the ill effects of the consequent diseased accumulation can no otherwise be avoided, than either by physically ridding the *primæ vitæ* of it before it gets into, and injures the more remote recesses of life ; or we must, by increased exercise or labour, make, if possible, that necessary, which would otherwise be disproportioned to the expence of the constitution.

THESE considerations discover to us the true reason why disorders, particularly those of the chronic kind, are much more rare in the brutal than in the human race: for the ordinary productions of nature afford no stimulatives to provoke the animal to transgress the salutary bounds of hunger; and therefore their diseases, at the same time that they are few and simple, are ordinarily provided for by instinctive indications to their cure. It is, however, almost unnecessary to remark, that from the above observation we must exclude those creatures which, unhappily for themselves, are taken out of the care of nature, and subjected to another train of management; for when a horse, for instance, by substituting reason for instinct, is taken under

under the care of man, we are not to wonder if the inferiority of the former to the latter is discovered by numberless consequent disorders to which the animal was not naturally subject, and which, as they are the bungling creation of reason, must depend upon that likewise for a cure, since nature has made no provision for them.

FROM this view of animal nature, we see things are so exquisitely ordered, that it is not easy, while the body and its perceptions are undepraved, for an evil to insinuate itself into the constitution; or, if it should do so, to remain there without producing a train of effects which discharge it.

THIS will be more plainly seen by considering a diseased process of any kind.

kind. Let us suppose it, for instance, of the nephritic sort, because here the evil is so gross and palpable, that we shall be able to follow it through the whole progress of its expulsion. If then a small stone is formed or lodged in the pelvis of the kidney, there it will remain, if not large, perhaps without pain, or giving much alarm, till by some accidental shock, or a particular position of the body, it drops into the ureter; and then the diseased process, or the cure of nature, which is only another mode of expression for a necessary train of consequences, commences, and will succeed in the following order. The sensible coat of the ureter will be first stimulated into pain by the irritation of so hard a substance : this will be soon increased by

by the necessary stretch of the superior part of the tube, occasioned, when the stone is large, by the obstruction of the urine. Pain always produces inflammation ; the constant effects of inflammation are convulsive twitches, which, by the assistance of the stomach, drawn likewise by a consent of parts into the same efforts, expel the mischief into the bladder, where it ordinarily passes off with the stream of urine. Thus the diseased process being finished, we see that the evil, by operating upon perceptive matter, became the cause of its own discharge.

AND here it is to be observed, that as the agents concerned in the nephritic cure were the foreign substance itself, and, subsequently, the pain pro-

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duced by it; so, in this view, the latter cannot be considered ultimately as an evil, because it was essentially necessary to the expulsion of the stone: for though every evil which invades the body has a direct tendency to destroy it, and all that train of necessary consequences arising from it within, are in themselves so many individual evils, (and such is the pain and inflammation in the disorder we have now under consideration) yet, by the infinite wisdom exerted in the constitution of animal nature, it is so contrived, that the whole concatenation of evils shall always have their tendencies so directed towards a right end, as to be subservient to the purposes of life, and ultimately destroy themselves by removing the fountain from whence they sprung.

IF therefore an opiate (which, notwithstanding, is, on some accounts, very useful in the paroxysm) did nothing else but, by inducing stupefaction, render the body insensible to the irritation of the mischief, it would be evidently pernicious, by so far causing a partial kind of death, which would, as long as it lasted, suspend the salutary, though distressing part of the process ; but happily the opiate, at the same time that it takes off the spasm of the ureter, relaxes it also ; so that the impending stream of urine meets with less opposition in pushing forward the stone.

So likewise in external injuries, if an animal sprains a limb, the notices of pain in the parts which have been

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injured, dispose him to place them in the situation which produces least uneasiness, and which is of course the very position where the injured parts are least upon the stretch, and consequently the best for the recovery of their tone. And as, by the accident, a number of lymphatic and other vessels are ordinarily burst, the necessary leakage from them produces a swelling, which becomes the equable bandage of nature, and is exceedingly useful in confining the limb in the situation in which the animal placed it; and this swelling ordinarily continuing till the injured ligaments or tendons have recovered themselves, the absorbent vessels, by taking up the extravasated fluid, remove it at that period when the tumor becomes unnecessary.

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THE same train of necessary consequences, arising from an evil with which the body is affected, appears also from wounds inflicted on the surface of it. Thus, for instance, when a considerable wound is inflicted on a muscular part, the first necessary consequence is, that the divided blood-vessels bleed freely, till, if the hæmorrhage is not in its nature mortal, the consequent faintness so far weakens the power of the heart, that the blood is not propelled with strength enough to force it any longer through the divided vessels, the mouths of which, by this time, begin to be choaked up by the grumous blood; and thus the hæmorrhage necessarily stops, or is cured. The next consequence is, that though the wound may be inflicted by

an instrument tolerably sharp, there are, however, some of the parts so far lacerated, and in part separated from the sounder, as not to be supported in a state of life : these, therefore, rotting into a stinking fancies, discharge themselves ; and this process continues so long as, and no longer than, the parts reduced to this condition are, by means of it, conveyed off. And now the first stage of digestion being over, and the wound of course clean, a soft balsamic moisture ouzing through the wound covers the surface of it, till the tender granulating flesh, guarded by this means from the injuries of the air, and rising under the protection of it, reaches the level of the skin, which then shooting horizontally forward, puts a stop to the discharge at the very time

time it ceases to be necessary. Thus the injured part is recovered, as far as the renovating principles of nature allow : these, indeed, are not absolutely perfect ; for, were they so, a wound would not leave its scar, and the body would become immortal.

INDEED, the process and œconomy of nature in curing common and ordinary injuries on the surface of the body in a healthy state of the animal, is generally so successfully executed, that it would be perhaps for our interest were we to give a little more credit to the same principle in wounds of greater importance ; for the more we contemplate this renovating power, the higher our veneration for it will certainly rise, and the more jealous we

we shall grow of the impertinent intrusions of art.

THE chirurgical world must be very sensible how much the curative doctrine of wounds has been, in this respect, indebted to the abilities of Mr. Sharp, who, from a knowledge grounded on great experience, and that perspicuity of reasoning only attendant on genius, has, not to express it in harsher terms, shewn the uselessness of the various medicines employed in the old systematic treatment of ordinary wounds, and simplified the whole farrago, where the habit of the patient is good, into little more than dry lint, or a soft, easy nothing. He has also remarked upon the ill effects produced on the tender granulations by

by the pernicious nicety of wiping off that soft and bland defence with which nature always guards the generating flesh. However, since the general tendency of Mr. Sharp's doctrine was almost wholly confined to the removing of impediments from the operations of nature; and since he clearly saw the folly of supposing, that either bone, flesh, or skin, was the production of the surgeon's boasted apparatus, and that therefore the whole process of healing was the act of the constitution; it is, perhaps, to be lamented, that he had not pursued his own convictions a little farther, by giving credit to the same simple treatment in wounds of greater importance, and even in those of a complicated kind.

WE know that the method of cure by inoculation, or what is generally called the first intention, if the wound is recent, and unaccompanied by laceration, is now much more practised than formerly, and is generally successful, provided the parts are retained in contact, in a perfect state of rest, and defended from the influence of the air. The success of this species of cure depends upon this principle, that the air is the great agent of putrefaction, at least that the common atmosphere is very active in promoting purulence and its concomitant symptoms, or of producing mischievous effects upon all the internal parts of the body which are not naturally exposed to its influence; consequently, when once a recent wound becomes subjected for any

any time to its agency, the first stage of digestion is produced by it, and then the order of cure necessarily proceeds in another and more tedious manner. Accordingly nature always guards against the effects of it as expeditiously and effectually as it can.

IF a large wound is inflicted upon a horse, and suffered to proceed without interruption in a way of nature, the blood itself that remains upon its surface, when the thinner parts of it are evaporated, forms a sufficient varnish or covering to defend the wound from the injuries of the air; and commonly the parts, without any digestion, heal under that defence.

IF there happens to be a loss of substance, or a part carried off by the blow,

blow, and the wound is therefore to be filled up by a generation of new flesh, the ouzing matter, which afterwards covers its surface, forms itself also into a crust ; and if, in those circumstances, the granulations, by growing faster than the shooting skin, and then rising above the level of it, should become an impediment to the cure, even here the evil remedies itself ; for as there is not a sufficient provision by nature for the support of this unnecessary generation, the excrecent mass dries into, and makes part of the general crust ; so that the skin, shooting under it, the whole covering drops off, and just at the time too that the wound is completely healed. In this manner Nature has a method of regulating the several parts of her operations, and  
keeping

keeping them within bounds ; for as every fungus, unaccompanied with caries, or any other unnatural state of the wound, is good flesh, and whenever it rises above the level of the skin, offends only by its luxuriance, it never rises but to a certain height, where not being sufficiently supported by an order of organized vessels, it always, if it is not kept moist by covering, grows into a scab, and drops off to the general level of the skin.

THAT the air is, in fact, a great agent of putrefaction in recent wounds of every sort, numberless instances sufficiently inform us. After an abscess is opened, and the matter discharged, the surgeon may immediately introduce his finger into the wound, and examine

the sides of it, without giving his patient any considerable uneasiness; but the introduction of the air at the same time, by acting upon the surface of the wound, and disposing the part to inflammation, will render such an attempt, the succeeding day, intolerably painful.

THE appearances attending very considerable contusions, those particularly which frequently happen in the foreheads of children, sufficiently inform us, by the colour, size, and feel of the sudden tumor, that there is underneath the skin a very large extravasation of blood and other juices from the leakage of the lacerated vessels: however, if the ordinary covering is not broke, we see that the absorptive powers

powers commonly return the extravasated fluid, and the injury the parts received is expeditiously repaired, without any succeeding inconvenience. But if the surgeon, by not giving a sufficient degree of credit to the powers of nature, inadvertently makes an opening in the skin to discharge the extravasated fluid, the introduction of the air converts the tumor into an ill-conditioned hollow wound, often as extensive as the injury, which, after discharging for some time a gleety sanies, is not perhaps healed at last without dilatation, and almost always with a loss of that substance which formed part of the digestion, as is afterwards discovered by the depressed surface of the skin when the wound is healed.

THE remarkable difference also between the effects of the caustic and knife in the radical cure of the hydrocele, in all probability arises from little else than the influence of the agency under consideration.

FROM frequent and familiar instances to the above purpose, I have long been confirmed in an opinion, that the great difference between compound and simple fractures in a great measure depends upon the above circumstance. That these accidents are in fact attended with consequences as different as can be conceived, constant experience convinces us; for as simple fractures, though the causes of them may have been attended with circumstances of the greatest violence to the injured

injured parts, are yet scarcely ever productive of danger ; so compound ones, in the ordinary management, are so truly formidable, sometimes from the loss of life attending the mortification of the limbs, always from a confinement of many months, and not unfrequently, at last, a mis-shapen, cumbersome leg, scarcely as good as a wooden one ; from these considerations, it is by no means clear that it would not be for the interest of the patient that, ordinarily, the limb should be amputated immediately on the accident, before nature is stimulated by it into the additional danger of a symptomatic fever.

WE frequently meet with simple fractures of the leg, where both the bones have been broken with the

greatest circumstances of violence; where they have been splintered; where they have been nearly pushed through the skin; and where by the appearance of the ecchymosis, or leakage from the torn vessels, the violence and laceration the parts have undergone are, sometimes demonstrably, as great as they can, and frequently more than they actually do, receive, in a compound fracture. But, notwithstanding all this, if the limb is not injured by motion or bandage, but left as nearly as possible to the treatment of nature, it is followed by none of those formidable circumstances which so strongly mark the character of the compound fracture, but usually by the inconvenience only of about six weeks confinement.

ON the contrary, if the bone happens but to push through the skin, or the surgeon, from an apprehension that the extravasation is too considerable for the absorbent vessels to return it into the habit, injudiciously makes an incision into the tumor, and by that means opens a communication with the external air; this exposure to its putrefying agency presently converts the simple fracture into the nature of a compound one, which is frequently attended with all that train of mischiefs so generally attendant on wounds of this sort.

IT is demonstrable, therefore, that the great difference, in those two species of fractures, must arise either from the mischiefs the lacerated parts of the

compound one receive from the action of the air upon them, or from the different quiet and rest the injured parts enjoy under the different management of those fractures, or from both causes united.

IN simple fractures, after the limb is, by proper management, placed in a good position, the irritation from pain being always considered as mischievous, is, as much as possible, avoided, and the whole process is subsequently left to nature in an undisturbed state of rest.

BUT in the compound fracture, besides a very long exposure to the mischievous agency of the air during the first examination, and frequently rough chirurgical

chirurgical treatment of imbridling the parts of the wound, as well as the irritating process of removing splinters, &c. &c. after the first risque of mortification from all this is over, the fresh and daily irritation the wound receives from the ordinary dressings, is increased occasionally also by sacrificing the ease and safety of the patient to a pernicious nicety, viz. that of keeping all clean, by every now and then moving the limb. This must be necessarily attended with very ill effects ; for though under the best assistance, and with the greatest caution, the limb be moved ever so gently, yet the fears of the patient will never permit him coolly and resolutely to repose that implicit confidence in those who raise and support his legs, as to leave it passively and intirely

intirely to them ; but he will (and in fact we see he does, by the tremulous and spasmodic efforts of the very parts which have been torn) endeavour, in some measure, to do it himself : and if to this consideration be added the unavoidable motion the parts must actually receive from the assistants themselves, it will be found impossible to prevent the painful irritation excited in the surrounding inflamed and injured parts by the ragged ends of the broken bones. And how far the agency of this painful aggravation is capable of producing that large flux of matter, and those successive abscesses, so frequently met with in the ordinary treatment of those formidable wounds, need not be explained.

SINCE then by an artificial, injudicious opening, and a consequent imprudent management, it is possible to convert a simple fracture into, and artificially to create all the mischiefs of a compound one, it should seem more than possible that, by inverting the treatment, and trusting more to nature, a compound fracture might, in some measure, be reduced to the state of a simple one.

ON this principle I have not only practised with success myself, but have seen instances where it has been adopted with equal advantage by Mr. Yonge, a very ingenious surgeon of this town ; and though I am sufficiently furnished with them, yet, as I should reluctantly enlarge this digression by a recital of cases,

cases, to demonstrate the practical truth of this doctrine, I will, however, take the liberty of relating one only, as a sample, which was communicated to me by Mr. Fortescue, a surgeon of this town, whose brother was the subject of the accident, and of this peculiar and successful species of treatment.

ON the 4th of July, 1770, at Launceston, about twenty-four miles from this town, the patient's horse having taken fright, ran away with him, and carried him with violence against the wall of a bridge, which broke his leg. Mr. Rowe, a surgeon of the town, was immediately called to his assistance; who, on examining the limb, found a compound fracture of the most formidable

formidable kind. The wound, which the protruding tibia had torn, was full four inches long, and so large, that he passed three of his fingers almost round the body of the bone ; and the hæmorrhage from it had been, and then was, very considerable. There were also several other smaller wounds formed by splinters of the bone ; the largest of which, a very considerable portion of the end of the tibia, being pretty loose, he endeavoured to extract ; but finding more force necessary for that purpose than was thought prudent to be exerted, the surgeon desisted from any further attempt. In these alarming circumstances, therefore, having placed the limb in a fracture-box, in the best position it was capable of, and having also hastily applied to the wound

wound a doffil of lint dipped in the traumatic balsam, and over that a pledgit spread with the Ung. e Gum. Elemi. secured with the many-tailed bandage, Mr. Rowe immediately dispatched a messenger hither with a letter to his brother, signifying, that as he was thoroughly persuaded an amputation was adviseable, and as expeditiously too as possible, he wished Mr. Fortescue's immediate attendance, as his patient would not submit to the operation but in his brother's presence, and with his approbation. Mr. Fortescue knowing that Mr. Yonge, with whom he had scrved his time, had lately, with great success, treated compound fractures in a way very different from the ordinary mode of practice, requested him to accompany him.

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On their arrival, they were agreeably surprised to find the patient in perfect ease, and without a symptomatic fever, owing partly, perhaps, to the large preceding hæmorrhage, and which also rendered any future bleeding unnecessary. On removing the many-tailed bandage, and some of the more superficial dressings, it appeared that those underneath had formed one general, hard, and impervious crust, which strongly adhered to the subjacent parts of the wound. The limb was observed to be without tension, and its general position unexceptionable. Under those favourable circumstances, Mr. Yonge had the resolution to expose his judgement to the hazard of censure, by strongly recommending, not only to suffer those dressings which were immediately in

in contact with the wound to remain untouched, but, more effectually to guard against the injuries of the air, he advised the whole to be covered with some more lint dipped in the traumatic balsam, and then to trust the issue to nature, or at least to regulate the future treatment by the ease of the patient, or the symptoms which might arise. Accordingly the limb remained totally untouched, and in an undisturbed state of rest, though the weather was excessively hot during the whole time, till the seventeenth day from the accident. At this time, some appearance of pus through the bandage disposed Mr. Fortescue to remove the dressings ; when the several smaller wounds, which had been made by the splinters of the bone, were found intirely

tirely cicatrized, and the large one formed by the protrusion of the bone was firmly incarned, though there was more than a spoonful of well-cocted matter upon it. The wound was then dressed with dry lint, with a pledgit of Ung. e Gum. Elemi. laid over it; and this dressing remained untouched eight days longer, viz. till the twenty-fifth, when, on its removal, the wound appeared sensibly contracted, a tendency to a speedy and firm cicatrization very manifest; and Mr. Fortescue thought the re-union of the bones, if not quite complete, very considerably advanced. Things being thus circumstanced, the leg was taken out of the fracture-box, and Mr. Sharp's splints being applied to it, the limb, from a strait position, was relaxed into

an easy flexure, to the great comfort and ease of the patient. From this time he was daily taken out of the bed till the thirty-third day, when he was removed, in a post-chaise, from Launceston to his own house, which, tho' a journey of twenty miles, was performed without uneasiness or fatigue. The cure now advanced in a very kindly way, and without any thing particular intervening, except that Mr. Fortescue extracted a small piece of ragged stone (which appeared to have been splintered off from the wall of the bridge) a few days before the wound shut up. Soon after this, the limb became strong, and in every respect as serviceable as the other.

ANY comment upon this cure would be unnecessary. I would only beg leave to

to address myself to the candour of the chirurgical reader, and ask, Whether he ever remembers to have seen a compound fracture, as formidably circumstanced as the above, reduced to such a state by the old scientific mode of management, as to enable the patient, with perfect ease and safety, to suffer a removal of twenty miles in less than five weeks after the accident. The truth is, at this period the patient's fracture was, by this mode of treatment, reduced to the state it would have been in had it been originally a simple one, excepting only a superficial wound of no sort of consequence.

MR. Fortescue informs me that, since the above case, he hath had many

compound fractures of both extremities, in different ages and constitutions; and one compound dislocation of the ankle, where the end of the fibula protruded above an inch beyond the skin: in all which the same treatment was uniformly attended with the same success; and in every instance he thought the callous formed as expeditiously as in simple fractures.

STRANGE as it may seem that so important a discovery should so long remain confined within such narrow limits, I have, however, been authentically informed by the late Mr. Woolcott, a surgeon of great experience at Fowey in Cornwall, that he had practised from this principle with uninterrupted success upwards of thirty years;

years; for, possessed of much originality, great strength of understanding, and a genius truly Hippocratic, his sagacity enabled him to avail himself of any truth that sprung from his own practice, or that fell in his way, though out of the ordinary and regular channel. However, what first led him to this mode of treatment, was a hint received from an old French surgeon who had long attended the army in Flanders. He informed Mr. Woolcott that he constantly observed, in the great number of cases of this sort which had fallen in his way, that he lost many of the better sort of patients, whom he attended and treated with all the attention of chirurgical address, whilst the common soldiers, in a state of, sometimes, unavoidable neglect, almost

always recovered ; in short, that scarcely any of his patients under compound fractures died, but those of whom he took a great deal of care. Mr. Woolcott availed himself of the hint, and adopted, the practice of dressing the wound as expeditiously as possible with the traumatic balsam ; and after securing his applications with a proper bandage, he placed the limb in the best position it was capable of ; and every morning, for the four or five succeeding days, it was his custom to pour the same balsam on the bandage, to exclude the air more effectually. Having thus artificially reduced the accident as near as possible to the state of a simple fracture, he never removed the dressings in less than three weeks or a month after, unless, which very rarely happened,

pened, great pain and an increasing fever gave rise to strong suspicions of an approaching mischief from confined matter; and, during the subsequent time of the cure, he seldom opened the leg oftener than every four or five days, and never, even then, if it could be possibly avoided, paid so much attention to cleanliness, as to irritate the parts by moving the limb. He always remarked, when the leg was opened, that if the wound happened not to be incarned, the bones, though covered by matter, appeared perfectly white; and observed no inconvenience ever arose from this practice, but an excoriation of the circumjacent skin from the lodgement of the matter upon it.

UPON the whole, the good effects of this method, in all the instances I have seen and heard of, have been constant and amazingly great; and as they have been certainly owing to a voluntary sacrifice of the whole parade of art, or chirurgical treatment, to the simple and undisturbed operations of nature, so I believe it to be the true reason why this practice has not long since become more extensive. I would not be understood to mean, however, that it can be proper, or even possible, to adopt this method in its utmost extent in all cases without exception or limitation; for if, for instance, the fractured ends of the bones should be so far pushed through the wound, or so circumstanced that they cannot be replaced in a tolerable position, they must

must certainly be sawed off; or, where the comminution is great, and the splintered parts of the bones are loose, and almost detached, they, without doubt, should be removed; but all this, and whatever else the circumstances of the fracture may render absolutely necessary to be done, should be performed with as little violence, and as much expedition as possible; after which it will be certainly found that the less is done so much the better.

I AM willing to hope this long digression will be sufficiently apologized for by the importance of it; and now hasten to a conclusion of the general subject.

IT has been observed that the operations of nature, in injuries inflicted on the surface of the body, as well as in the more simple and uncomplicated disorders of a vomiting and diarrhœa, arising from any thing pernicious in the stomach and intestines, are, from the wisdom exerted in the formation of the animal, the necessary result of the agency of that very evil which had a direct tendency to produce its destruction. And, from a well-grounded analogy also, it is very certain that the internal operations of nature, or that resistance to evil which constitutes acute diseases, (though all the various parts of each process, by being carried on in the secret and remote recesses of life, and not cognizable by our senses, are therefore not capable of specification)

tion) are undoubtedly also no less a train of necessary consequences resulting from the operations of something pernicious on the different internal perceptive organs of the body; insomuch, that as every falsehood in the moral world involves within it its own contradiction; and every degree of turpitude, though it has a direct tendency to subvert all happiness and good order, is nevertheless, by the wisest œconomy, defeated of its purpose, so far as eventually to destroy itself; so also every animal evil, after it has even insinuated itself into the constitution, carries with it those principles which, operating upon the powers of perception, are the causes of its own expulsion.

IN this view, then, in which nature, or that effort in the constitution of an animal to resist evil, and relieve itself from the effects of it, is here considered, its operations under the form of disease appear to be the aggregate of consequences necessarily resulting from that resistance which the various powers of the animal body make against it, and the effects they will be necessarily stimulated into by the very mischief itself. For as when the offending matter is foreign to that part of the body which may happen to be invaded by it, whether it arose from without, or originated from a vice or transposition of the fluids within, the part so affected by it will therefore be, as it were, provoked into expulsive efforts; so, for the same reason,

son, all the several parts upon which it is thrown, will successively disown and dislodge it from themselves, till it is quite expelled from the habit.

As, therefore, the Author of our being has, by the cautionary discernment of the senses, secured the constitution against the internal introduction of any principle that may be mischievous to it; and, to guard the animal against the general approach of external violence, has also completely invested it with a nervous plexas, so perfectly calculated for the purpose of defence, that the point of the finest needle cannot invade the skin without giving the alarm to the whole body; so every part of the same body, by being possessed of the same power of perception,

perception, is furnished with a last resource for its own private defence, after the enemy has got a footing in the citadel.

WHETHER that absence of all feeling, or the quiescent state which all the various vascular parts of the body enjoy in perfect health, and in possession of their own proper and unvitiated fluids, is owing to as many various and specific powers of perception, with which they may be supposed to have been endowed respectively *ab origine*; or whether it is only a result of that habitude to their several contents, which commenced from, and was coeval with, their being; and which therefore operates by the nature of simple perception only; to which of

of those principles it is owing that the  
fæculus of the viper is reconciled to its  
poison, the receptacle of the liver to  
the bile, the bladder to the urine, and  
the several parts of the body to the  
different fluids they contain, is perhaps  
a question of mere speculative curiosi-  
ty, with which, therefore, we are not  
much concerned ; it is fully sufficient  
that they do possess those perceptions.  
But it is true, and a truth of the ut-  
most practical consequence to us, that  
though the various perceptions which  
the several vascular parts have of their  
own proper fluids, may not originally  
and solely be owing to this principle  
of habitude, habitude is, however, effi-  
cacious enough to destroy them : and  
it is not less certain also, that the tran-  
quillity, or health and well-being of  
the

the animal, cannot be preserved when the several vessels are not possessed of their own proper fluids, either through contamination or change of place ; or, which is the same in effect, when, through irregularity or debauch, the vital principle of perception in those vessels is extinguished and lost.

HOWEVER considerable, and however essential to the preservation or recovery of the animal, this agency of nature is, it is notwithstanding, as we mentioned before, a fallible principle, and consequently not always equal, either to the purposes of perfectly securing the body from the introduction of evil, or when evil has got a footing in the habit, to that of restoring the constitution from a disordered to a perfect state of health.

And

And accordingly, at some times, from a sluggishness or insensibility produced by that habitude to evil, which is the cause of the greatest part of chronics---or at others, from the mortal virulence of the invading mischief, as in the instances of putrid and pestilential diseases----or, lastly, from an original languor or weakness of the powers of life, joined perhaps to the insidious nature of the invading enemy, which seems to be the case in nervous fevers; the agency of nature, I say, from these and other causes, is impotent and inefficacious. In those, and many other circumstances, therefore, it is the proper province of medicine to attempt the removal of the evil, by affording the powers of life a preternatural assistance, or to discharge it by an artificial

R disease,

disease, (for such in fact are the efforts to this purpose of every medicinal process) and to this end its powers are frequently very effectually exerted. Accordingly, in those kinds of fevers which take their rise from, and are afterwards supported and continued by, a vitiated bile, or other mischiefs in the first passages, a well-timed dose of an antimonial sometimes cuts the disease short at once, by discharging the evil before it passes into the habit, and mortally poisons the juices of the constitution; or, at others, happily prevents the continuance of the fever, by a removal of the fuel from whence it took its rise.

BUT when the remote recesses of life are contaminated from any inexplicable

plicable cause, insomuch that evacuations of the grosser kind are of course useless, as in fevers of the nervous tribe, &c. all the medicines which are efficaciously employed for their removal are possessed of active and energetic principles, which entering the inmost recesses of the constitution, do, by their several powers, stimulate the sluggish and inactive vascular perceptions to more vigorous exertions ; and under this idea, the operations of those agencies, adapted to the intention of producing or accelerating a critical termination of the fever, are truly analogous to those of ipecacuanha or jalap on the stomach or bowels. Thus, for instance, the active powers of cantharides, though only applied to the skin in a blistering plaster, do, by pervad-

ing the whole constitution, and the remotest orders of the vascular system, (which is evident from their effects upon the coats of the bladder) quicken a languid circulation, and raise a sluggish pulse, by stimulating the heart into greater, and frequently more effectual, exertions against the evil with which the blood is contaminated. And, as no part of the vascular system is excepted from their influence, the subtle pungent powers of those salts become truly and effectually a lymphatic and glandular purge, by a mode of operation similar to that of cathartics, &c. in the first passages, producing frequently those copious and stinking sweats so salutary in this disorder.

To

To conclude this subject: If what has been said is comprised under a short recapitulation, it will amount to this.

FIRST; That there is in animal nature a principle of renovation, which supplies the loss or waste sustained in the various operations of life.

SECONDLY; That in order to this end, the information for the necessary supply is signified by the instinctive incitements of simple hunger and thirst; and that the proper quantity of that supply is also determined by their notices.

THIRDLY; It was shewn, that as this supply must be collected out of

that infinite variety of substances which are dispersed throughout external nature ; and as from reason alone it would be impossible to make the proper choice, therefore the relation or mutual fitness between the internal parts of the body and those various substances is discovered to us by the senses ; and that these therefore are the instinctive tests of examination as to the quality of those substances which are adapted to the purpose of recruiting the body ; insomuch, that what is agreeable to them is ordinarily calculated for that end, and for the several demands of the animal œconomy ; and also, that the body is at the same time secured, by their discrimination or disapprobation, from the introduction of evil, or whatever would be mischie-

vous

vous to the internal state of the constitution.

FOURTHLY; It was observed also, that the pleasure which the senses afford us in the act of recruiting our strength, &c. was intended as an incitement to, and a reward for, the performance of this necessary duty: but it was subsequently remarked, however, that those incitements to it, sometimes, by abuse and indulgence, defeated their own end; and also, that though the senses, when in an undrav'd state, are ordinarily sufficient for the purposes of preservation, yet, that as they are fallible, and subject to deception, a principle of evil may sometimes, without notice, insinuate itself into the body.

FIFTHLY; It was further shewn that, besides those principles which the animal possesses for recruiting the waste of the body, and preserving it in health, it is furnished also with certain active powers, which operate towards a recovery of it from a diseased to a sound state; so that when, through the abuse or fallibility of the senses, any mischief gets an internal footing, a diseased process, or an effort towards recovery by an expulsion of the evil, commences; and that the first and most simple disease is produced by an effort made in the stomach, which, from a perception of its own analogous to that of the palate, is stimulated by the evil into a rejection of it; or if, by eluding that guard, the evil gains admittance into the bowels,

bowels, it there also frequently produces its own remedy, by provoking the intestines into a diarrhœa; i.e. that these therefore were diseases or resentments of nature under the simplest form.

LASTLY; We then proceeded to observe, that if, from the insidious and subtle nature of the evil, all those tests are cheated, insomuch that it passes into the more remote recesses of life; or if, by any means, a removal of the several original fluids from their own proper receptacles takes place; or a vicious state of them, from external influence or internal causes, is produced; we observed, I say, that even then the constitution is not left a defenceless prey to any destructive agency;

agency; but that, in analogy to all the prior means of security, the internal vascular parts of the body, from an equal principle of perception, are necessarily and successively stimulated by the evil itself into spasmodic efforts to dislodge it, which, for the same reason, continue till it is completely eliminated; and that the aggregate of those efforts form what is called an acute disease.

THUS we see that this salutary and efficacious power in animal life, which physicians call Nature, is one and the same living, perceptive principle, under various modes of operation. By its agency, through the several modifications of the sight, smell, and taste, it preserves the constitution from

con-

contamination, and secures its health; and being equally impressed upon the stomach, guts, and the internal vascular parts of the body, it cures by expelling the evil in the form of disease.—Residing in the senses under the most delicate and well-adapted species of feeling, this principle becomes, from this mode of its operation, a cautionary security against the introduction of mischief; and, by a gross and more palpable perception, resulting from actual contact with the internal and vascular parts of the body, the evil is expelled from the animal system, when it has gained admittance into it.

FROM this view, therefore, we may venture to give, perhaps with some degree

degree of precision, a rational and determined idea of Animal Nature, under the following definition, viz.

NATURE is a train of necessary, and, in some measure, mechanic consequences, resulting from the operation of matter, foreign and external, on the various parts of matter organized, and endowed by animation with specific perceptions.

F I N I S.

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